AS-BUILT BASELINE MONITORING REPORT

FINAL

DOUBLE H FARMS MITIGATION SITE
Alleghany County, NC
DEQ Contract No. 7608
DMS Project No. 100082

New River Basin HUC 05050001
USACE Action ID No. SAW-2018-01771
NCDEQ DWR#: 18-1270
RFP #: 16-007403
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Submission Date: April 29, 2022

PREPARED FOR:

NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

April 29, 2022

Mr. Harry Tsomides
Western Project Manager
NCDEQ – Division of Mitigation Services
5 Ravenscroft Drive, Suite 102
Asheville, NC 28801

RE: Task 6 – Final As-built Baseline Monitoring Report
Double H Farms Mitigation Site, Alleghany County
New River Basin – HUC 05050001
DMS Project ID No. 100082 / DEQ Contract #7608

Dear Mr. Tsomides:

Wildlands Engineering, Inc. (Wildlands) has reviewed the Division of Mitigation Services (DMS) comments from the Draft As-built Baseline Monitoring report for the Double H Farms Mitigation Site. The report and associated digital files have been updated to reflect those comments. DMS' comments are noted below in **bold** text. Wildlands' responses to DMS' report comments are noted below in *italics*.

Baseline Report, Record Drawings and As-Built Survey

1. DMS' comment: Please include a tabular summary of monitoring components (e.g., Tables 18/19 from the Mitigation Plan stating if there were any deviations; if there were no deviations please state such). If there were any additional monitoring measures (bog turtle habitat, bog plots etc.) please add.

Wildlands' Response: A tabular summary of monitoring component changes from the Mitigation Plan has been included in Section 4.1.17 of the report.

2. DMS' comment: Please include a subsection in Section 2.0 titled "Conservation Easement Encroachment" (or similar) and include a brief summary of how Wildlands intends to monitor the integrity of the easement boundary and markings for issues such as mowing/scalloping, installed posts that may have gone missing, fence damage, and cattle intrusions, etc.

Wildlands' Response: As requested, a brief summary of conservation easement monitoring, reporting, and/or remedial actions was added to Section 2.3.

3. DMS' comment: Field assessment appeared to show at least a couple vegetation plots (VP7 / UT4 R1, and VP9 / UT1A R1) that were moved significantly. VP7 appeared to have been placed about 150 LF downstream, and VP9 was placed across the channel, versus locations specified on the mitigation plan monitoring map. If there are significant spatial changes to any monitoring devices (vegetation plots, wetland and stream gauges etc.) versus the mitigation plan, please summarize.

Wildlands' Response: See response to DMS' comment 1.

DMS' comment: Is the landowner okay not having easement fencing around the pasture to the immediate west of Bog 2? While cattle are being kept out with a connector fence, this pasture seems like an area that will get farm use at some point.

Wildlands' Response: Yes, the landowner actually requested the fence line adjustment which will simplify boundary maintenance.

DMS' comment: Thank you for the culvert crossing photos both inlet and outlet.

Wildlands' Response: You are welcome.

DMS' comment: Please delete the Table 1 "project credit adjustments" sub-table, as this is not applicable.

Wildlands' Response: The "Project Credit Adjustments" sub-table has been removed from Table 1.

DMS' comment: Footnote 4 in Table 1 ("*Easement encroachments that will not be removed during MY1 maintenance activities have been excluded from stream lengths")* is a little confusing. I think I understand what is being said but please make this more clear if possible - maybe indicate encroachments being 'eliminated' rather than removed.

Wildlands' Response: Footnote 4 in Table 1 has been reworded for clarification.

DMS' comment: DMS appreciates Wildlands intentions to remove excess rip rap around several of the culverts to maintain the integrity of the project reaches and assets. Please provide an update with the Monitoring Year 1 Report.

Wildlands' Response: As requested, an update will be included in the MY1 report.

DMS' comment: No comments on the Record Drawings or As-Built Survey; DMS appreciates the appropriate level of detail in the redline drawings and the clarity of the callouts as well as the as-built survey stream/ project features.

Wildlands' Response: Thank you!

Digital Submittal Comments (email 3/31/2022)

DMS' comment: DMS is showing correspondence about the planting plan in the project folder. In Table 9 of the MY0 report it is suggested that red mulberry and painted buckeye are proposed stems (e.g., proposed in MY0) and 6 other stems are designated as "Approved Post Mit Plan". Judging from the "Double H Planting Revision_100082.xlsx" workbook, there does appear to be 6 stems included in the Final Approved table. Could Wildlands please verify that Table 9 is an accurate representation of the planting revision outlined in the correspondence? If not, please update the input and re-run the Veg Tool.

Wildlands' Response: Table 9 and associated report text were updated per the outlined correspondence by re-running the Veg Tool.

Please organize wetland shapes so that there is a single record for each entry in the asset table. So, in this case, there should only be 3 wetland features submitted. Please also only submit a single feature class characterizing the wetland assets. It is unclear if "Wetlands_20220218" or "Project_Wetlands_Union" is what should be used. The errors outlined below were identified using Wetlands_20220218.

Wildlands' Response: The wetland feature class has been revised by merging the wetland areas together by credit type. Now there is only feature class being submitted, and it has been renamed as "Wetlands_20220218_CreditMerge".

There is a gap between UT1A Reach 2 and UT1 Reach 1. Please connect these features.

Wildlands' Response: These features have been connected using the snapping tool.

The following stream assets intersect with wetland polygons in Wetlands_20220218:

- **UT1A Reach 1**
- **UT6**
- **UT1 Reach 1**
- **UT1 Reach 2**

Wildlands' Response: All stream intersections with wetland polygons have been removed from the credited wetland area.

There are 5 wetland polygons in Wetlands_20220218 that have portions of their shape outside of the easement. Please use the easement to clip the wetland features to ensure that creditable wetland area does not exist outside of the easement and update the asset table if necessary.

Wildlands' Response: All wetland polygons have been clipped to the easement boundary.

There was a small wetland overlap in Wetlands_20220218. This overlap is captured in the attached shapefile.

Wildlands' Response: The wetland feature class has been recreated by merging each credit type; therefore, no overlaps should be present.

As requested, Wildlands has included the revised digitals and report PDF for final completeness review. Upon approval, Wildlands will submit the Final Double H Farms Mitigation Site As-built Baseline Monitoring Report, record drawings, and a signed/sealed as-built survey. These will be submitted in the form of two bound hard copies and an USB drive containing a PDF of the final report and all digital support files in the correct file structure. Our written responses to your comments are inserted and bound within document after the report cover page.

Sincerely,

Kristi Suggs
Senior Environmental Scientist
ksuggs@wildlandseng.com

AS-BUILT BASELINE MONITORING REPORT

DOUBLE H FARMS MITIGATION SITE

Alleghany County, NC

New River Basin
HUC 05050001

DMS Project No. 100082
USACE Action ID No. SAW-2018-01771
NCDEQ DWR#: 18-1270

PREPARED BY:

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EXECUTIVE SUMMARY

Wildlands Engineering, Inc. (Wildlands) implemented a full-delivery stream mitigation project at the Double H Farms Mitigation Site (Site) for the North Carolina Department of Environmental Quality (DEQ) Division of Mitigation Services (DMS). The project restored, enhanced, and preserved 8,650.0 linear feet (LF) of streams and preserved and enhanced 5.714 acres (AC) of wetlands in Alleghany County, NC. The work proposed on the Site will provide 6,560.410 stream mitigation units (SMUs) and 2.151 wetland mitigation units (WMUs). The Site is located within the Blue Ridge Physiographic Province of North Carolina and is within the Little River targeted local watershed Hydrologic Unit Code (HUC) 05050001030020.

The Site's immediate drainage area as well as the surrounding watershed has a long history of agricultural activity. Stream and wetland functional stressors for the Site were related to both historic and current land use practices. Major stream stressors for the Site include livestock trampling and fecal coliform inputs, lack of stabilizing stream bank and riparian vegetation, active erosion, and incision. The effects of these stressors resulted in channel instability, degraded water quality, and the loss of both aquatic and riparian habitat throughout the Site's watershed when compared to reference conditions. The project approach for the Site focused on evaluating the Site's existing functional condition and evaluating its potential for recovery and need for intervention. The Site was selected based on its potential to support the objectives and goals of multiple conservation and watershed planning documents such as the 2004-2007 Little River and Brush Creek Local Watershed Plan (LWP), the 2009 New River Basin Restoration Priorities (RBRP), and the 2015 North Carolina Wildlife Resource Communion's (NCWRC) Wildlife Action Plan (WAP).

The project excludes livestock, creates stable stream banks, converts pasture to forest, and implements best management practices (BMPs) to filter agricultural runoff. These actions address stressors identified in the RBRP and the WAP by reducing fecal, nutrient, and sediment inputs to project streams, and ultimately to Crab Creek. Approximately 21.2 acres of land has been placed under permanent conservation easement to protect the Site in perpetuity. The established project goals include:

- Treat concentrated agricultural run-off,
- Improve in-stream habitat,
- Improve the stability of stream channels,
- Restore and enhance native floodplain and wetland vegetation,
- Exclude livestock from streams and wetlands, and
- Permanently protect the project site from harmful uses.

The Site's construction was completed in September 2021. The as-built survey was completed between October 2021 and December 2021. Planting and baseline vegetation data collection occurred in mid-January 2022. Installation of monitoring features and sediment data collection was completed in January 2022. Fencing installation was completed in December 2021. Adjustments made during construction and specific changes are detailed in Section 4. Baseline (MY0) profiles and cross-section dimensions closely match the design parameters with little variation. The Site has been built as designed and is expected to meet the upcoming monitoring year's success criteria.

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APPENDICES

Section 1.0 PROJECT GOALS, BACKGROUND, AND ATTRIBUTES

1.1 Project Location and Setting

The Double H Farms Mitigation Site (Site) is situated in the Blue Ridge Physiographic Province of North Carolina, in the rural countryside in Alleghany County near Ennice, NC (Figure 1). The Site is loosely bound by Little Pine Road to the southwest, Crab Creek Road to the west, and Wilson Road to the north (Figure 3.0). Ten unnamed tributaries (UTs) to Crab Creek (UT to Crab Creek, UT1, UT1A, UT3, UT3A, UT4, UT5, UT6, UT7, and Hillside Tributary) were protected as part of the project. The project restored, enhanced, and preserved 8,650 linear feet (LF) of streams and preserved and enhanced 5.714 acres (AC) of wetlands in Alleghany County, NC. Additionally, pastureland was converted into riparian buffer, and through exclusion of cattle from Site streams and wetlands. The work proposed on the Site will provide 6,560.410 stream mitigation units (SMUs) and 2.151 wetland mitigation units (WMUs). The Site is located within the Little River targeted local watershed Hydrologic Unit Code (HUC) 05050001030020 in the northeastern portion of the New River basin 05050001 (New 01). This Site was included in the 2004-2007 Little River and Brush Creek Local Watershed Plan (LWP).

The UT to Crab Creek topography is a moderately sloped valley for that runs northeast through the center of the Site, while steeper valleys of the adjoining tributaries join the UT to Crab Creek valley from both the north and south. A holistic watershed-scale restoration approach has been used for much of the Site, as the project extends to the headwaters on UT1A, UT3A, UT4, UT5, Hillside Tributary, UT6, and UT7. The project approach for the Site focused on evaluating the Site's existing functional condition, potential for recovery, and need for intervention.

Prior to restoration activities, the Site's streams were in various stages of impairment related to the current and historical agricultural land uses. Onsite bank erosion and areas of concentrated cattle activity were determined to be the largest sources of instream sedimentation observed. Major stream stressors for the Site included livestock trampling and fecal coliform inputs, lack of stabilizing stream bank and riparian vegetation, active erosion, and incision. The effects of these stressors resulted in channel instability, degraded water quality, and the loss of both aquatic and riparian habitat throughout the Site's watershed when compared to reference conditions. Upstream of the project limits, UT3 and UT6 are both stable with predominantly wooded watersheds and are not expected to generate significant sources of sediment.

Pre-construction conditions are outlined in Table 4 of Appendix 1 and Table 6 of Appendix 2.

1.2 Project Goals and Objectives

The Site is providing numerous ecological benefits within the New River Basin. The project goals were established with careful consideration to address stressors that were identified in the 2004-2007 Little River and Brush Creek Local Watershed Plan, the 2009 New River Basin Restoration Priorities (RBRP) report, and the 2015 North Carolina Wildlife Resource Commission's (NC WRC) Wildlife Action Plan (WAP). The project has improved stream functions through stream restoration and enhancement, the conversion of maintained pastureland into riparian buffer, and through exclusion of cattle from the Site's streams and wetlands. Improvements are outlined below as project goals and objectives.

Goal	Objective
Exclude livestock from stream channels and wetlands.	Install livestock fencing as needed to exclude livestock from stream channels, wetlands, and riparian areas.

Goal	Objective
Restore and enhance native floodplain vegetation.	Convert active cattle and hog pasture to forested riparian buffers along all Site streams. Protect and enhance existing forested riparian buffers. Treat invasive species. Allow wetlands determined to have good bog turtle potential to be open herbaceous areas that naturally succeed.
Improve the stability of stream channels.	Reconstruct stream channels slated for restoration with stable dimensions and appropriate depth relative to the existing floodplain. Add bank revetments and instream structures to protect restored/ enhanced streams.
Improve instream habitat.	Install habitat features such as constructed steps, cover logs, and brush toes on restored reaches. Add woody materials to channel beds. Construct pools of varying depth. Remove man-made impoundment.
Treat concentrated agricultural runoff.	Install agricultural BMPs in areas of concentrated agricultural runoff to treat runoff before it enters the stream channel.
Permanently protect the project site from harmful uses.	Establish a conservation easement on the Site. Exclude livestock from Site streams.

1.3 Project Structure, Restoration Type and Approach

The final Mitigation Plan was approved in November of 2020. Construction activities were completed in September 2021 by Wildlands Construction. Kee Land Surveying, PLLC completed the as-built survey in December 2021. Following construction, Bruton Natural Systems, Inc. completed riparian planting in January 2022.

A copy of the final sealed survey is included in Appendix 4. Field adjustments made during construction are described in further detail in Section 4 and depicted in the record drawings in Appendix 4. Please refer to Appendix 1 for detailed project activity, history, contact information, and watershed/site background information.

1.3.1 Project Structure

Project mitigation components are outlined in the Mitigation Assets and Components Table (Table 1) and depicted in the Monitoring Plan View Maps (Figures 3.0 - 3.4) that are located in Appendix 1.

1.3.2 Restoration Type and Approach

The design approach for this Site was chosen based on the surrounding landscape, climate, natural vegetation communities but also with thorough consideration of existing watershed conditions. The project includes stream restoration, enhancement, and preservation as well as wetland preservation and enhancement. The specific stream and wetland mitigation types are illustrated in Figure 2 and detailed below. The Site vegetative planting plan is depicted on sheets 2.0 through 2.8 of the record drawings located in Appendix 4.

Restoration and enhancement I reaches were designed to create stable, functional stream channels with improved dimension and profile, while pattern adjustments were restricted primarily to restoration reaches. Cross-sectional areas were sized for frequent overbank flows. Bedforms were stabilized and varied with the use of in-stream structures to reduce channel erosion and improve aquatic habitat. Restoration reaches were constructed as priority 1 except where priority 2 grading was needed to transition with existing grade elevations and/or confluences. Enhancement II reaches retained their existing dimension, pattern, and profile. Work consisted primarily of correcting trampled banks and stabilizing isolated areas of bank erosion.

All project reaches are protected in perpetuity with the implementation of a conservation easement. This not only improves Site streams but restores the habitat fragmentation caused by the past agricultural land use practices. Restoration of riparian buffers connects the entire watershed to the existing forested areas upstream of UT3 and UT6 to provide an uninterrupted riparian corridor.

Fencing was installed outside of the easement to exclude cattle from the project area. See Section 4.12 for discussion of fencing deviations and areas to be corrected in MY1. The streambanks and floodplains were planted with native woody and herbaceous species as depicted in the planting plan of the record drawings located in Appendix 4.

Preservation Reaches

UT1 Reach 1 and UT1A Reach 2 were preserved. Both reaches were located in a wooded buffer that was fenced from cattle prior to the project. UT1A Reach 2 is a small, stable stream channel that is connected to the floodplain. Bedform diversity on this reach includes riffles and some rock step formations upstream of UT1A Reach 2's confluence with UT1. UT1 Reach 1 has a broad alluvial valley alluvial and supports headwater forest wetlands. UT1 Reach 1 is stable with low banks and diverse bedform formed from gravel and cobbles. Oriental bittersweet (*Celastrus orbiculatus*) and Multiflora rose (*Rosa multiflora*) were treated along UT1 in July 2021.

Enhancement II Reaches

UT1 Reach 2, UT3, UT3A, UT5 Reach 1, UT6, and Hillside Tributary underwent an enhancement level II approach. These reaches were relatively stable geomorphically at the time of project design. However, cattle access to the streams resulted in poor quality buffer vegetation and areas of trampled stream banks. Enhancement level II activities included correcting isolated areas of bank erosion, excluding livestock, and planting woody vegetation. Localized invasive species were also treated where needed in July 2021. All enhancement II channels are wholly encompassed within the conservation easement without internal crossings, except for UT6 which is detailed below.

UT6 originates from a hillside seep as an intermittent stream where no work was conducted, and no credit is being sought. Enhancement II activities for credit on UT6 begin at Station 603+92. An existing internal farm road crossing, from Station 605+26 to Station 604+71, was upgraded to a 24-inch corrugated metal pipe (CMP). The crossing is lies within an internal easement break and is excluded from stream credit; however, there are two small encroachments of riprap from the crossing into the easement. These are discussed in further detail in Section 4.2.1. At Station 608+59, UT6 enhancement II ends and the channel becomes braided within an alluvial fan, extending to the confluence with UT to Crab Creek. No credit is being sought for this downstream section of stream.

Enhancement I Reach

An enhancement I approach was implemented for UT4 Reach 2 and included complete stream realignment in areas where the pattern was unstable, spot stabilization in areas with localized erosion, and instream structures were installed to correct isolated areas of incision. A small section of the channel near the reach break with Reach 1 was realigned to avoid a group of established trees along the stream bank, and an internal farm road crossing was added from Station 413+54 to Station 413+96. The crossing is excluded from stream credit; however, there is an encroachment into the easement from the riprap surrounding the crossing's inlet. The encroachment will be removed from the easement during MY1 maintenance activities and is discussed in further detail in Section 4.2.1.

Restoration Reaches

UT to Crab Creek

UT to Crab Creek Reach 1 flows southeast into the project limits from a residential parcel and was brought back up onto the historic floodplain near the upstream project boundary, allowing for immediate transition

to priority I restoration. UT to Crab Creek flows through a confined valley at the property boundary but widens as it approaches the UT7 confluence and continues northeasternly for approximately 130 linear feet. Downstream of the UT7 confluence, an internal farm road crossing was installed using a large arched CMP. A small portion of the downstream headwall currently encroaches into the easement; however, the encroachment will be removed from the easement during MY1 maintenance activities. See Section 4.2.1 for additional information. Downstream of the crossing, UT to Crab Creek flows through a broad valley with a gentle slope. UT to Crab Creek Reach 1 was designed as a B4 channel. At Station 119+36, UT to Crab Creek Reach 2 begins and the restored channel shifts to a meandering C4 channel with a flatter slope. Riffle-pool sequences and woody cover structures were added to increase habitat diversity. An additional farm road crossing was installed within an internal easement break along Reach 2 from Station 114+46 to Station 114+98. UT to Crab Creek continues downstream and outlet's the project at Station 129+95.

UT1A

UT1A Reach 1 begins as a perennial channel at Station 150+00 below a hillside seep within a confined valley near the northwest corner of the Site and flows east to join UT1. UT1A Reach 1 was raised to the historic floodplain and underwent priority 1 restoration until transitioning to Reach 2 at Station 162+04, which is a stable preservation reach that can easily access the floodplain. UT1A was designed as a B4a channel and in-stream structures such as rock sills, log sills and constructed riffles were added for grade control, bank stability, and habitat. There are two internal easement crossings along Reach 1 that are removed from stream credit calculations. One is a farm road crossing that lies within an internal easement break from Station 154+73 to Station 155+17 that replaces an existing upstream crossing at Station 154+00. The other is an existing 30-foot-wide utility corridor from Station 157+02 – Station 157+49.

UT4 Reach 1

Restoration of UT4 Reach 1 begins at a an existing headcut just downstream of the Crab Creek Road culvert at station 400+09. UT4 was raised to meet the invert of the culvert to promote aquatic species passage. UT4 was restored to a B4a channel. Riffle-pool sequences and woody cover structures were added to increase habitat diversity. Priority 1 restoration continues downstream to UT4 Reach 2 at Station 409+00, as the valley widens to a moderately confined channel. A transitional length of priority 2 was used tie UT4 Reach 1 into UT4 Reach 2. A farm road crossing using a 42-inch arched CMP was installed within an internal easement break for an existing utility corridor from Station 404+33 – 404+74. The internal easement break has been removed from stream credit; however, a small section of the crossing's upstream, riprap headwall encroaches into the easement.

UT5 Reach 2

An inline pond and its embankment were removed from UT5 Reach 2 to restore the original valley gradient and re-establish the channel through priority 1 restoration. Unconsolidated sediments were excavated from the pond bed, dried, mixed with topsoil, and respread within the conservation easement prior to planting. UT5 Reach 2 begins at Station 502+52 and was reconstructed through the restored valley as a B4a channel. Riffle-pool sequences and woody cover structures were added to increase habitat diversity. UT5 ties into UT to Crab Creek Reach 1 at Station at 505+57.

UT7

UT7 was brought onto the historic floodplain beginning at what was previously a headcut at the upstream project boundary, allowing for immediate transition to priority 1 restoration at Station 700+19. UT7 was restored to a B4a channel. Riffle-pool sequences and woody cover structures were added to increase habitat diversity. Priority 1 restoration continued downstream to UT7's confluence with UT to Crab Creek at Station 704+71.

<u>BMPs</u>

Dry detention basin BMPs were installed upslope of UT5 Reach 1 and UT7 and outside of jurisdictional

features to capture concentrated agricultural runoff. The BMPs were designed to allow for sediment accumulation over time and transition from depressional storage to a flat, vegetated filter strip. Each BMP's outlet and berm were planted with a permanent riparian seed-mix. Outside of activities to maintain the integrity of the structure's stability, neither BMP will be maintained.

Wetland Preservation and Enhancement

The project enhanced and preserved approximately 5.41 and 0.31 acres of on-site wetlands, respectively. Existing forested wetlands C and F were preserved along UT1 Reach 1. These wetlands were fenced from cattle access prior to project implementation but contained heavy pockets of invasive vegetation. As previously stated for the preservation reaches, invasive vegetation was treated during the Site's construction in July 2021. Further maintenance of invasive species will be conducted throughout the remainder of the seven-year monitoring period.

Wetland enhancement activities included fencing out cattle, treating invasive vegetation, and planting native species. Wetlands AA, W, V, R, P, and N were determined by Alderman Environmental during a May 15-16, 2019 site review and by NC WRC during a June 23, 2020 site walk to have potential bog turtle habitat, and no planting was conducted within these wetlands outside of a top of bank off-set of 15-feet along all tributaries and 30-feet along UT to Crab Creek. A few existing red maples that were located within the no planting zone were timbered from Wetland N during construction. Native trees that volunteer over the monitoring period within these no planting zones will be managed annually to maintain suitable habitat for bog turtle populations. The remainder of the wetland enhancement areas were planted with a mix of native woody and herbaceous wetland species.

Preservation wetlands are depicted in green on Figures 3.0 – 3.4, while the wetland enhancement areas with potential for bog turtle habitat are displayed in orange and the remainder of the enhancement wetlands are shown in yellow.

1.4 Project History, Contacts and Attribute Data

The Site was restored by Wildlands through a Full Delivery contract with the Division of Mitigation Services (DMS). Tables 2, 3, and 4 in Appendix 1 provide detailed information regarding the project activity and reporting history, project contacts, and project baseline information and attributes.

Section 2.0 PERFORMANCE CRITERIA & MONITORING PLAN

The stream performance criteria for the Site will follow approved performance criteria presented in the Double H Farms Mitigation Site Mitigation Plan (Wildlands, 2020) and is based on the performance criteria presented in the DMS Stream and Wetland Mitigation Plan Template and Guidance (June 2017) and the NC IRT Wilmington District Stream and Wetland Compensatory Mitigation Update (10/24/2016). Specific performance standard components are proposed for stream morphology, stream hydrology, and riparian and wetland vegetation. Performance criteria will be evaluated throughout the seven-year post-construction monitoring period.

Annual monitoring will consist of collecting morphologic, vegetative, and hydrologic data to assess the project success based on the restoration goals, as outlined in the Mitigation Plan (Wildlands, 2020). Installed monitoring devices and plot locations closely mimic the locations of those proposed in the Site's Mitigation Plan. Deviations from these locations were made when professional judgement deemed them necessary to better represent as-built field conditions or when installation of the device in the proposed location was not physically feasible.

Project success will be evaluated by measuring channel dimension, vegetation, surface water hydrology, and by analyzing photographs and performing visual assessments. Any high priority problem areas identified, such as unstable stream banks, bed instability, aggradation/degradation, and/or poor vegetation establishment will be evaluated on a case-by-case basis. The problem areas will be visually noted and reported to DMS staff in the annual report. Standard DMS monitoring reports will be submitted in monitoring years one, two, three, five, and seven. Monitoring activities in years four and six will be documented in a memorandum to include a project summary update, annual photos, and updated monitoring plan map. Closeout will occur seven years beyond completion of construction or once performance standards are met. All survey data will be georeferenced to North Carolina State Plane coordinates. Refer to Tables 5a-b in Appendix 1 for the monitoring component summary.

2.1 Streams

Geomorphic assessments follow guidelines outlined in the Stream Channel Reference Sites: An Illustrated Guide to Field Techniques (Harrelson et al., 1994), methodologies utilized in the Rosgen stream assessment and classification documents (Rosgen, 1994 and 1996), and in the Stream Restoration: A Natural Channel Design Handbook (Doll et al., 2003). Please refer to Figures 3.0 through 3.4 in Appendix 1 for monitoring locations discussed below.

2.1.1 Dimension

Riffle cross-sections on the restoration reaches should be stable and should show little change in bankfull area, bank height ratio, and width-to-depth ratio. Per NC IRT guidance (2016), bank height ratios shall not exceed 1.2 and entrenchment ratios shall be at least 1.4 for restored B channels and 2.2 for restored C channels to be considered stable. Riffle cross-sections should fall within the parameters defined for channels of the appropriate stream type. Note that wider floodplains were achieved through priority 1 restoration for the B-type channels on site thus resulting in higher-than-expected entrenchment ratios. If any changes from baseline occur, these changes will be evaluated to assess whether the stream channel is showing signs of instability. Changes in the channel that indicate a movement toward stability or enhanced habitat include a decrease in the width-to-depth ratio in meandering channels or an increase in pool depth. Remedial action would not be taken if channel changes indicate a movement toward stability.

To assess channel dimension performance, 14 permanent cross-sections were installed along stream restoration or enhancement I reaches as defined in Tables 18 and 19 of the Mitigation Plan. Cross-section locations were chosen in the field to be representative of the typical dimensions for each project reach. Each cross-section is permanently set with rebar installed in concrete and marked with ½ inch PVC pipes.

Cross-section surveys will include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg. Cross-section surveys will be conducted in monitoring years one, two, three, five, and seven. Photographs will be taken of the cross-sections looking upstream and downstream during the survey assessment.

2.1.2 Pattern and Profile

Visual assessments and photo documentation should indicate that streams are remaining stable and do not indicate a trend toward vertical or lateral instability. Signs of instability may include bank scour, bank migration, and bed incision. Longitudinal profile surveys will not be conducted during the seven-year post-construction monitoring period unless other indicators during the annual monitoring indicate a trend toward vertical and lateral instability. Stream pattern and profile will be assessed visually as described below in Section 2.3.

2.1.3 Substrate

Restoration reaches should show a progression towards or the maintenance of coarser materials in the riffle features and smaller particles in the pool features. However, natural variations in pool and riffle substrate are expected as a result of sediment transport processes in steeper sloped channels. Riffles may fine over the course of monitoring due to the stabilization of contributing watershed sediment sources. Reachwide and 100-count substrate sampling were conducted during baseline conditions survey to classify the reach and characterize riffle pavement. Based on a DMS Technical Workgroup memo from 10/19/21 and DMS PM approval (Tsomides email correspondence, 2021), pebble counts will not be conducted during the remaining monitoring years unless requested by the IRT or deemed necessary by best professional judgement. A copy of the DMS Technical Workgroup Memo and corresponding emails are located in Appendix 5.

2.1.4 Photo Documentation

Photographs should illustrate the Site's vegetation and morphological stability on an annual basis. Cross section photos should demonstrate no excessive erosion or degradation of the banks. Longitudinal photos should indicate the absence of persistent mid-channel bars or vertical incision. Grade control structures should remain stable. Deposition of sediment on the bank side of the vane arm is preferable. Maintenance of scour pools on the channel side of vane arms is expected. A total of 31 permanent photograph reference points were established along the stream reaches and the floodplain area after construction. Photographs will be taken once a year to visually document stability for the seven-year monitoring period. Permanent markers were established and located with GPS equipment so that the same locations and view directions on the site are photographed each year. Photos will be used to monitor all stream reaches.

Longitudinal reference photos were established along the channel by taking a photo looking upstream and downstream. Cross-sectional photos will be taken of each permanent cross-section looking upstream and downstream.

A photo was taken of the inlet and outlet of each of the 6 internal culvert crossings on the Site. Therefore, a total of 12 reference photos will be retaken each year to document the conditions of the culvert crossings.

2.1.5 Stream Hydrology

<u>Bankfull Events</u>

Stream hydrologic monitoring will be conducted on mitigation streams that utilize restoration and/or enhancement I level approaches where in-stream work conducted alters channel dimensions below the bankfull elevation. Automated pressure transducers will be used to document bankfull events during the seven-year monitoring period and will herein be referred to as "crest gages (CG)". Crest gages will be set to record bankfull events at least every 3 hours. Evidence of bankfull events, such as the occurrence of

debris lines and sediment deposition, will be documented with a photo when possible. Stream monitoring will continue until performance standards in the form of four bankfull events occurring in separate years, have been documented. Evidence of bankfull events, such as the occurrence of debris lines and sediment deposition, will be documented with photos when possible. Three CGs were installed with the project Site and are located along UT to Crab Creek Reach 2, UT4 Reach 2, and UT1A Reach 1. The transducer data will be plotted and included in the annual monitoring reports.

Baseflow Monitoring

The occurrence of baseflow will be documented on restored intermittent streams to track the frequency and duration of stream flow events. Continuous surface water flow within the intermittent tributaries must occur every year for at least 30 consecutive days and can occur at any point during the year. Additional monitoring may be required if surface water flow cannot be documented due to abnormally dry conditions. Automated pressure transducers used to record baseflow will be referred to as "stream gages (SG)". One SG was installed on the upper third of the intermittent portion of UT1A Reach 1 and has been set to record at least every 3 hours. Evidence of channel flow will be documented with a photo when possible.

2.2 Vegetation

Vegetation monitoring plots installed throughout the Site will measure the survival of the planted stems and percent herbaceous cover. The number of monitoring plots required across the entire Site and frequency of monitoring was determined by the DMS monitoring guidance documents and the October 2016 IRT Mitigation Monitoring Guidance. Vegetation monitoring protocols followed the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008); however, vegetation data processing follows the NCDMS Vegetation Data Entry Tool and Vegetation Plot Data Table (NCDMS, 2020). Please refer to Figures 3.0 through 3.4 in Appendix 1 for monitoring locations discussed below.

2.2.1 Woody Planting Area

The final vegetative performance standard for permanent and mobile vegetation plots will be the survival of 210 planted stems per acre in the planted riparian and wetland areas at the end of the required seven-year monitoring period. The interim measure of vegetative success for the Site will be the survival of at least 320 planted stems per acre at the end of monitoring year three (MY3) and at least 260 stems per acre at the end of MY5. Also, trees must average six feet in height at the end of the fifth monitoring year, and eight feet in height at the end of the seventh monitoring year. Species classified as shrubs are excluded from the height requirement. The extent of invasive species coverage will also be monitored and controlled as necessary throughout the required monitoring period.

Vegetation monitoring plots (9 permanent and 5 mobile) were installed across the Site to measure the survival of the planted stems. Vegetation plots were randomly established within the open riparian buffer and wetland areas to capture the heterogeneity of the designated vegetative communities. Vegetative plot monitoring will occur between July 1st and leaf drop during post-construction monitoring years one, two, three, five, and seven. Permanent plots will be monitored in accordance with the guidelines and procedures outlined in the 2016 NC IRT Stream and Wetland Mitigation Guidance to assess vegetative success. For both permanent and mobile plots, all woody stems, including exotic and invasive species, should be counted. Supplemental plantings and volunteer plants must be present for at least two growing seasons before counting toward performance standards in monitoring years five and seven. Exotic/invasive species will not count toward success of performance standards.

All of the permanent vegetative plots were established either as a standard 10-meter by 10-meter square plot or an optional 5-meter by 20-meter rectangular plot. The vegetation plot corners have been marked and are recoverable either through field identification or with the use of a GPS unit. Reference photographs were taken at the origin looking diagonally across the plot to the opposite corner during MY0 in January

2022. Subsequent assessments in monitoring years one, two, three, five, and seven, following baseline survey, will capture the same reference photograph locations.

To evaluate random vegetation performance for the Site, 5 mobile vegetation plots were established in MY0, for use in MY1, using a circular or 100 m^2 square/rectangular plot. Mobile plots will be re-established in different and random locations throughout the open, planted conservation easement in monitoring years one, two, three, five, and seven. These locations will be geographically recorded and depicted in the CCPV maps for the corresponding monitoring assessment year. Mobile vegetation plot assessments will document the number of stems, number and type of species, and stem height within the plot.

Please refer to Figures 3.0 through 3.4 in Appendix 1 for the permanent and mobile vegetation monitoring plot locations.

2.2.2 Potential Bog Turtle Habitat Wetland Areas

Two bog monitoring plots were installed in the potential bog turtle habitat wetland enhancement areas. The herbaceous bog turtle habitat will be visually monitored for percent vegetative cover. Additionally, the final vegetative performance standard for potential bog turtle habitat wetlands will be at least 80% vegetated cover with at least 50% of the composite species containing a wetland indicator status of facultative or greater. Native woody species that volunteer within the potential bog turtle habitat wetland areas (outside of the required streamside buffers) during the monitoring period will be managed annually. Vegetative species within the potential bog turtle habitat wetland monitoring plots will be recorded to track species diversity. The extent of invasive species coverage will also be monitored and controlled as necessary throughout the required monitoring period.

2.3 Visual Assessments

Visual assessments should support the specific performance standards for each metric as described above. Visual assessments will be performed along stream reaches on a semi-annual basis during the seven-year monitoring period. Areas of concern, such as channel instability (i.e., lateral and/or vertical instability and in-stream structure failure, instability, and/or piping), poor vegetation health and/or establishment (i.e. low stem density, bare areas, high mortality rates, and/or invasive species), easement encroachment, beaver activity, and/or livestock trespass will be mapped, photographed, and described in the annual monitoring reports. Problem areas will be re-evaluated during each subsequent visual assessment. Should remedial actions be required, recommendations will be provided in the annual monitoring report.

2.3.1 Conservation Easement Monitoring

As briefly mentioned in Section 2.3 Visual Assessments, the conservation easement will be assessed biannually and during monitoring activities to ensure the integrity of the boundary. Activities that may pose potential and/or direct liabilities include mowing/scalloping overreach, missing boundary markers, fence damage, cattle intrusions, and vehicular trespass. During boundary assessments these types of activities will mapped, photographed, and/or described in annual monitoring reports. Upon notation of areas of concern, remedial actions may be necessary and will be conducted on a case-by-case occurrence. These may include notification of the property owner, removal of livestock, fence repair, the repair, replacement, and/or addition of boundary markers, the installation of horse tape or other visual markers, and/or supplemental planting.

2.4 Wetland Hydrology

NC DWR requested that ground water gages be installed within existing wetlands to monitor the affect of stream restoration on existing wetland hydrology. To heed this request, two representative gages (In- situ Level TROLL® 100 pressure transducers) were installed in Wetland M and Wetland S to capture this

information. The data will be reported annually during the established growing season for Allegheny County, NC. The growing season based on data compiled from the SPARA 3.5 SSW, NC WETS Station (1971 – 2000) is from April 26 through October 11 under typical precipitation conditions. Since these gages were installed solely to verify the continuation of hydrologic wetland functions during the growing season, no performance criteria were established. The groundwater gages are set to record the groundwater level four times per day and will be downloaded during site visits. The locations of the groundwater gages are denoted in Figures 3.0 through 3.4 in Appendix 1.

2.5 Schedule and Reporting

Monitoring reports will be prepared in the fall of each year of monitoring and submitted to DMS. Based on the DMS Annual Monitoring Report Format, Data Requirements, and Content Guidance (June 2017), the monitoring reports will include the following:

- Project background which includes project objectives, project structure, restoration type and approach, location and setting, history and background,
- Project Asset Map of major project elements,
- Photographs showing views of the restored Site taken from fixed point stations,
- Current Conditions Plan View Maps (CCPV) with monitoring features and current problem areas noted such as stability and easement encroachment based on the cross-section surveys and annual visual assessments,
- Assessment of the stability of the stream based on the cross-sections,
- Vegetative data as described above including the identification of any invasion by undesirable plant species,
- A description of damage by animals or vandalism,
- Detailed and documented maintenance issues and recommended remediation measures, as needed, and
- Wildlife observations.

Section 3.0 ADAPTIVE MANAGEMENT AND CONTINGENCY PLAN

3.1 Adaptive Management Plan

Wildlands will perform maintenance as needed on the mitigation project. A physical inspection of the Site shall be conducted a minimum of once per year throughout the post-construction monitoring period or until performance standards are met. These site inspections may identify site components and features that require routine maintenance. Routine maintenance for stream features should be most often expected in the first two years following the Site's construction. The need for maintenance will be evaluated annually during monitoring activities. Maintenance may include the following activities.

Component/ Feature	Maintenance through project close-out
Stream	Routine channel maintenance and repair activities may include chinking of in-stream structures to prevent piping, securing of loose coir matting, and supplemental installations of live stakes and other target vegetation along the channel – these shall be conducted where success criteria are threatened or at the discretion of the Designer. Areas where storm water and floodplain flows intercept the channel may also require maintenance to prevent bank failures and head-cutting. Beaver activity will be monitored and beaver dams on project streams will typically be removed, at the discretion of the Designer, during the monitoring period to allow for bank stabilization and stream development outside of this type of influence.
Wetlands	Routine wetland maintenance and repair activities may include supplemental installations of target vegetation within the wetland. Areas where storm water and floodplain flows intercept the wetland may also require maintenance to prevent scour that adversely and persistently threatens wetland habitat or function. Native trees that volunteer during the monitoring period within the wetland no planting zones will be managed annually.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species treatment will be conducted per the Invasive Species Treatment Plan, outlined in Appendix 7 of the Double H Farms Mitigation Plan (2020), and in accordance with NC Department of Agriculture (NCDA) rules and regulations.
Site Boundary	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis.
BMP	BMP maintenance activities may be done to ensure stabilization and vegetation establishment success early in the project. These areas are intended to transition to vegetated filter strips during the life of the project. Once this is accomplished no long-term maintenance will be required. Short-term maintenance activities could include supplemental planting, seeding or live staking to prevent erosion while vegetation is establishing.

The Wildlands Team will develop necessary adaptive measures or implement appropriate remedial actions in the event that the Site or a specific component of the Site fails to achieve the success criteria outlined above. The project-specific monitoring plan developed during the design phase identifies an appropriate threshold for maintenance intervention based on the monitored items. Any actions implemented will be designed to achieve the success criteria specified previously and will include a work schedule and updated monitoring criteria. If, during annual monitoring, it is determined the Site's ability

to achieve Site performance standards are jeopardized, Wildlands will notify the members of the DMS and work with them to develop contingency plans and remedial actions.

Section 4.0 AS-BUILT CONDITION (BASELINE)

Site construction was completed in September 2021. The installation of monitoring features was completed in December of 2021. The as-built survey, which included developing an as-built topographic surface and locating the channel boundaries, structures, and cross-sections, was collected in October and November 2021 and completed in December of 2021. Fencing installation was completed and surveyed in December 2021. The Site's construction planting was completed on January 15, 2022. The collection of sediment and vegetative data were completed by February of 2022.

4.1 Record Drawings

Changes were implemented at several locations during construction including material type, the addition and/or removal of structures, and grading. These changes were made due to unforeseen site conditions and availability of on-site materials. In all instances, the changes provide the same, if not better, stability, habitat, and functional uplift. A sealed half-size survey and record drawing are located in Appendix 4. The record drawing includes redlines for any significant field adjustments made during construction that were different from the design plans. Specific changes by reach project area are detailed below. Encroachments are detailed in Section 4.2.

4.1.1 UT TO CRAB CREEK REACH 1

- STA 101+91 – BUILT LOG J-HOOK WITH SILL IN PLACE OF ROCK J-HOOK WITH SILL DUE TO EXCESS LOGS
- STA: 102+26 – ROCK SILL ADDED FOR POOL STABILITY
- STA: 102+53 – BUILT LOG SILL IN PLACE OF ROCK SILL DUE TO EXCESS LOGS
- STA: 102+68 – SILL IN POOL REMOVED DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 102+89 – LOG SILL ADDED FOR EXTRA STABILITY
- STA: 103+33 – 103+38 – 5 LF OF RIPRAP HEADWALL ENCROACHMENT INTO THE CONSERVATION EASEMENT. SEE SECTION 4.2.1 FOR ADDITIONAL INFORMATION.
- STA: 103+35 – LOG J-HOOK BUILT IN PLACE OF ROCK J-HOOK DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 103+46 – LOG J-HOOK BUILT FOR ADDED STABILITY
- STA: 103+69 – LOG J-HOOK BUILT IN PLACE OF ROCK J-HOOK DUE TO DESIGN CHANGE PRIOR TO CONSTRCTION
- STA: 103+84 – BRUSH TOE ADDED FOR STABILITY
- STA: 104+26 – SILL IN POOL REMOVED DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 105+04 – BUILT LOG SILL IN PLACE OF ROCK SILL DUE TO EXCESS LOGS
- STA: 105+80 – BUILT LOG J-HOOK WITH SILL IN PLACE OF ROCK J-HOOK WITH SILL DUE TO EXCESS LOGS
- STA: 106+12 – BUILT LOG SILL IN PLACE OF ROCK SILL DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 106+16 – BRUSH TOE ADDED FOR STABILITY
- STA: 106+21 – ROCK SILL NOT BUILT DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 106+33 TO 106+53 – POOL EXTENDED DOWNSTREAM FOR ADDED STABILITY
- STA: 106+67 – BUILT ROCK SILL IN PLACE OF LOG SILL FOR HABITAT DIVERSITY
- STA: 106+80 – ROCK SILL NOT BUILT DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 106+85 – LUNKER LOGS ADDED FOR BIODIVERSITY
- STA: 107+15 – ROCK SILL NOT BUILT DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 107+60 – ROCK SILL NOT BUILT DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION

- STA: 107+85 – BUILT ROCK SILL IN PLACE OF LOG SILL FOR HABITAT DIVERSITY
- STA: 107+91 – ROCK SILL NOT BUILT DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 108+33 – BUILT LOG SILL IN PLACE OF ROCK SILL FOR HABITAT DIVERSITY
- STA: 109+80 – ROCK SILL REMOVED FROM POOL DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 110+46 – ROCK SILL REMOVED FROM POOL DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 111+09 – LOG SILL REMOVED FROM POOL DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 112+47 – BUILT LOG SILL FOR ADDED STABILITY
- STA: 112+71 - 112+90 – RIFFLE EXTENDED DUE TO CHANGE PRIOR TO CONSTRUCTION
- STA: 112+78 – ROCK SILL REMOVED PRIOR TO CONSTRUCTION DUE TO DESIGN CHANGE
- STA: 113+85 – BUILT LOG J-HOOK IN PLACE OF ROCK J-HOOK WITH SILL DUE TO EXCESS LOGS
- STA: 115+81 – ROCK SILL REMOVED FROM POOL PRIOR TO CONSTRUCTION DUE TO POOL STABILITY
- STA: 115+83 – BRUSH TOE ADDED FOR STABILITY
- STA: 115+91 – ROCK SILL REMOVED FROM POOL PRIOR TO CONSTRUCTION DUE TO POOL STABILITY
- STA: 116+91 – BRUSH TOE ADDED FOR STABILITY
- STA: 116+96 – ROCK SILL REMOVED FROM POOL PRIOR TO CONSTRUCTION DUE TO POOL STABILITY
- STA: 117+47 – BUILT LOG SILL IN PLACE OF ROCK SILL DUE TO EXCESS LOGS
- STA: 117+62 – ROCK SILL REMOVED FROM POOL PRIOR TO CONSTRUCTION DUE TO POOL STABILITY
- STA: 118+24 – ROCK SILL REMOVED FROM POOL PRIOR TO CONSTRUCTION DUE TO POOL STABILITY
- STA: 118+67 – BUILT LOG J-HOOK WITH SILL IN PLACE OF ROCK J-HOOK WITH SILL DUE TO EXCESS LOGS
- STA: 118+85 – RIFFLE ADDED DUE TO DESIGN CHANGE DURING CONSTRUCTION
- STA: 118+99 - RIFFLE ADDED DUE TO DESIGN CHANGE DURING CONSTRUCTION
- STA:119+02 – BUILT ROCK SILL IN PLACE OF LOG SILL FOR DIVERSITY
- STA: 119+10 – 119+36 – LOG SILLS AT STATION 119+10, 119+16, AND 119+25 WERE REPLACED BY A RIFFLE DURING FINAL DESIGN PRIOR TO CONSTRUCTION

4.1.2 UT TO CRAB CREEK REACH 2

- STA: 120+26 – LOG J-HOOK WITH SILL BUILT IN PLACE OF ROCK J-HOOK WITH SILL DUE TO EXCESS LOGS
- STA: 120+42 – 124+00 – POOLS FILLED WITH SEDIMENT. AS VEGETATION STABILIZES FLOODPLAIN, POOLS SHOULD CLEAR.
- STA: 123+36 – BRUSH TOE ADDED FOR STABILITY
- STA: 123+68 – LOG SILL NOT BUILT DUE TO DESIGN CHANGE PRIOR TO CONSTRUCTION
- STA: 124+42 – ROCK SILL ADDED FOR STABILITY
- STA: 125+93 – BUILT LOG J-HOOK IN PLACE OF ROCK J-HOOK WITH SILL DUE TO EXCESS LOGS
- STA: 127+12 – 129+40 – DESIGN PROFILE CHANGED DURING FINAL DESIGN, BUT PRIOR TO CONSTRUCTION
- STA: 127+ 69 – BUILT LOG J-HOOK WITH SILL IN PLACE OF ROCK SILL FOR ADDITOINAL GRADE STABILITY AND BANK PROTECTION
- STA: 128+27 – ROCK SILL ADDED TO LOG J-HOOK FOR ADDED STABILITY
- STA: 128+49 – 128+80 - ROCK SILLS AT STATION 128+49, 128+59, AND 128+71 WERE REPLACED BY A RIFFLE DURING FINAL DESIGN PRIOR TO CONSTRUCTION
- STA: 128+90 – RIFFLE ADDED FOR DIVERSITY
- STA: 128+95 – BUILT LOG SILL IN PLACE OF ROCK SILL FOR DIVERSITY
- STA: 129+02 – 129+50 - ROCK SILLS AT STATION 129+02, 129+10, 129+20, AND 129+30 WERE REPLACED BY A RIFFLE DURING FINAL DESIGN PRIOR TO CONSTRUCTION
- STA: 129+51 – BUILT LOG J-HOOK IN PLACE OF ROCK J-HOOK WITH SILL DUE TO EXCESS LOGS

- STA: 129+69 – BRUSH TOE REPLACED ROCK SILL FOR ADDED BANK PROTECTION
- STA: 129+78 – SHORTENED RIFFLE PER ENGINEER'S DISCRETION

4.1.3 UT1 REACH 1

- STA: 106+10 TO STA: 106+61 – 38 LF OF STREAM REALIGNED. PRECONSTRUCTION CHANNEL ALIGNMENT MIGRATED PRIOR TO CONSTRUCTION. NEW ALIGNMENT STABILIZED DURING CONSTRUCTION. LOG SILL ADJUSTED FOR CHANNEL REALIGNMENT.

4.1.4 UT1 REACH 2

- STA: 106+61 TO STA: 106+86 – 17 LF OF STREAM REALIGNED. PRECONSTRUCTION CHANNEL ALIGNMENT MIGRATED PRIOR TO CONSTRUCTION. NEW ALIGNMENT STABILIZED DURING CONSTRUCTION. LOG J-HOOK ADJUSTED FOR CHANNEL REALIGNMENT.
- STA: 106+89 – LOG SILL ADDED FOR STABILITY
- STA: 107+22 – LOG SILL ADDED FOR STABILITY

4.1.5 UT1A REACH 1

- STA: 150+07 – SILL ADDED FOR STABILITY
- STA: 150+20 – RIFFLE ADDED FOR STABILITY
- STA: 150+25 – SILLS ADDED FOR STABILITY
- STA: 150+96 – 154+20 - SILLS ADDED FOR STABILITY AT STATIONS 150+96, 151+17, 151+27, 151+43, 151+59, 151+74, 151+91, 152+05, 152+21, 152+41, 152+58, 152+78, 153+00, 153+28, 153+49, 153+69, 153+90, AND 154+07
- STA: 154+20 – 154+73 – ROCK SILLS ADDED FOR STABILITY AT STAIONS 154+23, 154+37, AND 154+52
- STA: 154+83 – 155+10 – FARM ROAD CROSSING AND RIPRAP ABUTMENTS WERE ADDED DURING FINAL DESIGN
- STA: 155+51 – 158+70 - ROCK SILLS ADDED FOR STABILITY AT STATIONS 155+51, 155+72, 156+04, 156+23, 156+43, 156+62, 156+94, 157+70, 158+03, 158+17, 158+35, 158+65
- STA: 158+ 86 – ROCK SILL ADDED FOR STABILITY
- STA: 159+00 – ROCK SILL ADDED FOR STABILITY
- STA: 159+14 – 159+30 – SEDIMENTATION FILLED POOLS AND COVERED INSTALLED RIFFLE, ROCK SILL, AND BRUSH TOE
- STA: 159+50 – ROCK SILL ADDED FOR GRADE STABILITY
- STA: 159+61 – ROCK SILL NOT BUILT DUE TO POOL STABILITY
- STA: 159+86 – ROCK SILL ADDED FOR GRADE STABILITY
- STA: 159+96 – ROCK SILL NOT BUILT DUE TO POOL STABILITY
- STA: 160+17 – 161+62 – ROCK SILLS ADDED FOR GRADE STABILITY
- STA: 161+67 – BOULDER TOE ADDED FOR BANK PROTECTION AND STABILITY
- STA: 161+77 – ROCK SILL ADDED FOR GRADE STABILITY
- STA: 161+93 – ROCK SILL ADDED FOR GRADE STABILITY

4.1.6 UT3

- STA: 305+61 – BUILT RIFFLE TO STABILIZE CHANNEL AT CONFLUENCE

4.1.7 UT4 REACH 1

- STA: 400+19 – RIPRAP ADDED FOR BANK STABIILTY IN DRAINAGE SWALE
- STA: 400+22 – 400+80 - SILLS ADDED TO THE RIFFLE TOE FOR GRADE STABILITY AT STATIONS 400+22, 400+45, AND 400+80
- STA: 400+89 – ROCK SILL NOT BUILT DUE TO POOL STABILITY

- STA: 401+07 – 401+93 - ROCK SILLS ADDED TO THE RIFFLE TOE FOR GRADE STABILITY AT STATIONS 401+07, 401+28, 401+46, 401+74, AND 401+93
- STA: 402+18 – EXTENDED RIFFLE INTO POOL FOR EXTRA STABILITY
- STA: 402+30 – SHORTENED RIFFLE TO ALLOW FOR LARGER POOL DUE TO STABILTY
- STA: 402+42 – 403+38 – ROCK SILLS ADDED TO THE RIFFLE TOE FOR GRADE STABILITY AT STATIONS 402+42, 402+67, 402+97, 403+21, AND 403+38
- STA: 403+51 – RIPRAP ADDED ALONG DRAINAGE SWALE TO THE TOP OF BANK FOR STABIILTY
- STA: 403+60 – ROCK SILL MOVED UPSTREAM FROM POOL TO TOE OF RIFFLE FOR STABILITY
- STA: 403+90 – SILLS ADDED TO THE RIFFLE TOE FOR STABILITY
- STA: 404+06 – SILLS ADDED TO THE RIFFLE TOE FOR STABILITY
- STA: 404+20 – 404+30 – RIFFLE EXTENDED INTO POOL FOR GRADE CONTROL
- STA: 404+30 – 403+33 - 3 LF OF RIPRAP HEADWALL ENCROACHMENT INTO THE CONSERVATION EASEMENT
- STA: 404+75 – 407+00 - SILLS ADDED FOR ADDITIONAL GRADE CONTROL AT STATIONS 404+75, 404+98, 405+12, 405+39, 405+64, 405+84, 406+00, 406+16, 406+38, 406+84, AND 407+00
- STA: 407+10 – RIFFLE EXTENDED UPSTREAM TO REPLACE ROCK SILL AT ENGINEER'S DISCRETION
- STA: 407+38 – 407+90 - SILLS ADDED FOR ADDITIONAL GRADE CONTROL AT STATIONS 407+38, 407+51, 407+72, AND 407+90
- STA: 407+95 TO 408+35 – POOL EXTENDED AND RIFFLE SHIFTED DOWNSTREAM INTO POOL FOR STABILTY
- STA: 408+14 – ROCK SILL MOVED UPSTREAM FROM STA 408+30 FOR GRADE CONTROL
- STA: 408+20 – BRUSH TOE SHORTENED TO MATCH REVISED MEANDER POOL LENGTH
- STA: 408+69 – BUILT LOG SILL IN PLACE OF ROCK SILL DUE TO EXCESS LOGS
- STA: 408+91 – LOG SILL ADDED FOR GRADE STABILITY

4.1.8 UT4 REACH 2

- STA: 409+06 – 409+55 - SILLS ADDED AT RIFFLE TOE FOR STABILITY. ROCK SILLS ADDED AT STATIONS 409+06 AND 409+55. LOGS SILLS ADDED AT STATIONS 409+19 AND 409+35.
- STA: 409+61 TO 410+39 – 91 LF OF STREAM REALIGNED TO AVOID TREES. RIFFLES AND SILLS ADJUSTED FOR CHANNEL REALIGNMENT.
- STA: 411+25 – RIFFLE ADDED FOR BED GRADE STABILITY
- STA: 412+82 TO 413+47 – ROCK CASCADE AND LOG SILLS (STA: 412+90, 412+99, 413+10, 413+34) BUILT TO PREVENT LATERAL CHANNEL MIGRATION AND PROVIDE GRADE CONTROL.
- STA: 413+47 – 413+54 – RIPRAP HEADWALL ENCROACHMENT IN THE CONSERVATION EASEMENT. SEE SECTION 4.2.1 FOR ADDITIONAL INFORMATION.
- STA: 413+89 – ROCK SILL ADDED FOR ADDITIONAL GRADE CONTROL
- STA: 414+08 – 414+25 - RIFFLE AND ROCK SILL AT RIFFLE TOE ADDED DURING FINAL DESIGN FOR CONTROL
- STA: 414+41 – BRUSH TOE ADDED FOR STREAM BANK PROTECTION
- STA: 414+60 – 414+63 - RIFFLE AND ROCK SILL AT RIFFLE TOE ADDED DURING FINAL DESIGN FOR CONTROL
- STA: 414+73 – CONSTRUCTION REPAIR EXTENDED RIFFLE UPSTREAM AND REPLACED ROCK SILL (STA: 414+69) IN POOL TO INCREASE BED STABILITY
- STA: 414+84 – 415+23 - RIFFLE REPLACED SERIES OF ROCK SILLS DURING FINAL DESIGN FOR ADDITIONAL STABILITY
- STA: 415+03 – ROCK SILL IN POOL REMOVED DUE TO POOL STABILTY

4.1.9 UT5 REACH 1 BMP

- REMOVAL OF RIPRAP INLET EXTENSIONS TO BMP DURING FINAL DESIGN

4.1.10 UT5 REACH 2

- STA: 502+56 – BUILT LOG SILL IN PLACE OF ROCK SILL DUE TO EXCESS LOGS
- STA: 502+72 – LOG SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 502+80 – RIFFLE NOT BUILT DUE TO CHANGE DURING CONSTRUCTION
- STA: 502+85 – LOG SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 503+06 – ROCK SILL AT RIFFLE TOE ADDED STABILITY
- STA: 503+15 – LOG SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 503+24 – RIFFLE NOT BUILT DUE TO CHANGE PRIOR TO CONSTRUCTION
- STA: 503+34 – ROCK SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 503+37 – BRUSH TOE NOT BUILT DUE TO ADEQUATE POOL STABILITY
- STA: 503+49 – LOG SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 503+70 – ROCK SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 503+80 – RIFFLE NOT BUILT DUE TO CHANGE DURING CONSTRUCTION
- STA: 503+93 – LUNKER LOGS ADDED FOR DIVERSITY
- STA: 503+93 – RIFFLE NOT BUILT DUE TO CHANGE DURING CONSTRUCTION
- STA: 503+99 – LOG SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 504+17 – LOG SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 504+34 – LOG SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 504+38 – BRUSH TOE NOT BUILT DUE TO ADEQUATE POOL STABILITY
- STA: 504+55 – LOG SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 504+70 – RIFFLE SHORTENED PER ENGINEER'S DISCRETION
- STA: 504+78 – ROCK SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 505+01 – LOG SILL AT RIFFLE TOE ADDED FOR STABILITY
- STA: 505+07 – POOL FILLED WITH SEDIMENT. AS VEGETATION STABILIZES FLOODPLAIN, POOLS SHOULD CLEAR.
- STA: 505+08 – BRUSH TOE NOT BUILT DUE TO ADEQUATE POOL STABILITY

4.1.11 UT6

- STA: 605+24 – 605+26 – 2 LF OF RIPRAP ENCROACHMENT INTO CONSERVATION EASEMENT AT PIPE INLET
- STA: 605+71 – 605+72 – 1 LF OF RIPRAP HEADWALL ENCROACHMENT IN CONSERVATION EASEMENT
- STA: 605+76 – ROCK SILL ADDED FOR STABILITY

4.1.12 UT7 BMP

- SECONDARY RIPRAP INLET REMOVED ON BMP DUE TO SUFFICIENT FLOW FROM PRIMARY INLET
- RIFFLE EXTENDED UPSTREAM FOR ADDITIONAL STABILITY

4.1.13 UT7

- STA: 700+08 – RIFFLE MOVED UPSTREAM DUE TO CHANGE PRIOR TO CONSTRUCTION
- STA: 700+13 – ROCK SILL ADDED FOR STABILITY
- STA: 700+46 – ROCK SILL MOVED DOWNSTREAM FROM 700+37 TO PROVIDE ADDITIONAL STABILITY AT CONFLUENCE WITH BMP OUTLET
- STA: 700+75 – ROCK SILL NOT BUILT DUE TO REVISED DESIGN DURING CONSTRUCTION
- STA: 701+60 – 702+49 – ROCK SILLS ADDED AT THE RIFFLE TOE FOR STABILITY AT STATIONS STA: 701+80, 701+97, 702+20, 702+36, AND 702+49
- STA: 702+68 – LOG SILL ADDED AT THE RIFFLE TOE FOR STABILITY

- STA: 702+83 – ROCK SILL ADDED AT THE RIFFLE TOE FOR STABILITY
- STA: 702+97 – LOG SILL ADDED AT THE RIFFLE TOE FOR STABILITY
- STA: 703+15 – ROCK SILL ADDED AT THE RIFFLE TOE FOR STABILITY
- STA: 703+30 – LOG SILL ADDED AT THE RIFFLE TOE FOR STABILITY
- STA: 703+45 – ROCK SILL ADDED AT THE RIFFLE TOE FOR STABILITY
- STA: 703+67 – LOG SILL ADDED AT THE RIFFLE TOE FOR STABILITY
- STA: 703+86 – ROCK SILL ADDED AT THE RIFFLE TOE FOR STABILITY
- STA: 704+04 – LOG SILL ADDED AT THE RIFFLE TOE FOR STABILITY
- STA: 704+21 – ROCK SILL ADDED AT THE RIFFLE TOE FOR STABILITY
- STA: 704+41 – LOG SILL ADDED AT THE RIFFLE TOE FOR STABILITY

4.1.14 WETLAND V

- LOG SILL MOVED UPSTREAM TO ADDRESS HEADCUT
- RIPRAP AND LOG SILL ADDED AT CONFLUENCE FOR EXTRA STABILITY

4.1.15 Vegetation Planting List & Plan

After the Final Double H Site Mitigation Plan (Wildlands, 2020) was submitted, the IRT continued a discussion about the Site's proposed planting plan. After a few modifications and discussions, the IRT approved the final planting plan revisions in August 2021 (Browning, 2021). Documentation of the original Mitigation Plan's species list, the subsequently revised species list, and the final IRT approved species list (8/18/2021) is included in Appendix 5. Both the buffer planting zone and the wetland planting zone are included.

At the time of planting in January 2022, two species, cucumber magnolia (*Magnolia acuminata*) and sweet birch (*Betula lenta*), from the final IRT approved species list were replaced due to the inability to source the stems. The species were replaced by red mulberry (*Morus rubra*) and painted buckeye (*Aesculus sylvatica*) in the buffer planting area. Both substitute species were planted at the same density as the original proposed species. All changes were entered into the Vegetation Data Entry Tool and Vegetation Plot Data Table (NCDMS, 2020) as proposed species to be approved by the IRT post-mitigation plan.

The vegetation planting plan changes were limited to culvert crossings, the addition of two BMPs, and two channel re-alignments. The changes are depicted on pages 2.1 – 2.8 of the record drawings and shown in red. They are outlined below.

UT to Crab Creek Reach 1

- STA 102+90 - 103+27 – Pasture seeding replaced by the installation of a gravel road crossing
- STA 114+55 - 114+85 – Pasture seeding replaced by the installation of a gravel road crossing

UT1A Reach 1

- STA 154+82 – 155+12 - Pasture seeding replaced by the installation of a gravel road crossing

UT1 Reach 1 & Reach 2

- STA 106+10 – 106+86 - Riparian planting area revised as part of the stream realignment

UT4 Reach 1

- STA 404+38 – 404+72 - Pasture seeding replaced by the installation of a gravel road crossing
- STA 409+61 – 410+39 – Riparian planting area revised as part of the stream realignment

UT4 Reach 2

- STA 413+58 – 413+84 - Pasture seeding replaced by the installation of a gravel road crossing

UT5

- BMP added at final design replaced riparian seeding in left floodplain

UT6

- STA 605+34 – 605+68 - Pasture seeding replaced by the installation of a gravel road crossing

UT7

- BMP added at final design replaced riparian seeding in right floodplain

4.1.16 Fencing

There were multiple changes in the alignment of the fence throughout the Site. They are outlined below. Fence line encroachments are outlined in Section 4.2.2.

Fence line adjustments at the request of landowner to simplify the boundary.

Wetland Areas

- Eastern corner of Wetland W to the western corner of Wetland V.
- Southeastern corner of Wetland R to the northeastern corner of Wetland R along Hillside Tributary.

UT1A:

- STA 150+00 - 155+00: Right floodplain.
- STA 150+00 - 158+75: Left floodplain.

UT4:

- STA 400+09 - 409+25: right floodplain
- STA 408+50 - 413+50: left floodplain.

Fence line removed. Cattle no longer have access to the adjacent parcel.

UT to Crab Creek:

- STA 100+09: Right floodplain.

Fence line added to ensure cattle exclusion.

UT7:

- STA 700+75 – 703+90: Left floodplain.

4.1.17 Monitoring Components

Installed monitoring devices and plot locations closely mimic the locations of those proposed in the Site's Mitigation Plan. Deviations from these locations were made when professional judgement deemed them necessary to better represent as-built field conditions or when installation of the device in the proposed location was not physically feasible. They are outlined below.

UT to Crab Creek Reach 1

- STA 110+50 and 110+75 – XS4 and XS5 were moved downstream to STA 118+24 and 118+43, respectively.

UT to Crab Creek Reach 2

- No deviations.

UT1A Reach 1

- STA 158+50 - Permanent Vegetation Plot (VP9) was moved slightly downstream from the right floodplain to the left floodplain.

- STA 158+70 and 158+90 – Cross-sections 13 (XS13) with Crest Gage 3 (CG3) and XS14, were moved upstream to STA 156+35 and 156+45, respectively.

UT1A Reach 2

- STA 162+50 – Photo Point 29 (PP29) was moved slightly downstream from the right floodplain to the left floodplain near STA 162+85.

UT1 Reach 1

- No deviations.

UT1 Reach 2

- No deviations.

UT3A

- No deviations.

UT3

- No deviations.

UT4 Reach 1

- STA 400+90 – VP7 was moved downstream near STA 403+00.
- STA 402+50 – PP18 was moved slightly downstream from the left bank to the right bank to STA 403+05.
- STA 406+75 – CG2 was moved downstream to Reach 2, STA 409+16, at XS11.

UT4 Reach 2

- STA 412+70 and 413+05 – XS11 and XS12 were moved upstream to STA 409+16 and 409+39, respectively.

UT5 Reach 1

- STA 501+10 – PP16 was moved from the left bank to the right bank.

UT5 Reach 2

- No deviations.

Hillside Trib

- No deviations.

Wetland V

- No deviations.

UT6

- STA 605+00 – PP13 was moved slightly upstream from the right bank to the left bank.
- STA 608+25 – PP14 was moved slightly upstream from the right bank to the left bank.

UT7

- STA 701+90 – XS1 was moved downstream to STA 703+96.

4.2 Encroachments

4.2.1 Culvert Crossing Encroachments

Easement encroachments to be resolved:

Though the following encroachments will be corrected during MY1 maintenance activities, the areas were documented on the record drawings as red lines. They are as follows:

UT to Crab Creek Reach 1:

- Sta. 103+33 - 103+38: Downstream of crossing in the right floodplain, the riprap headwall encroaches into the easement 5 LF. This area will be addressed during MY1 maintenance, so that no portion of the headwall encroaches into the easement.

UT4 Reach 2:

- Sta. 413+47 – 413+54: Upstream of the crossing at the pipe inlet, the riprap headwall extends 7 LF into the conservation easement. This area will be addressed during MY1 maintenance, so that no portion of the headwall encroaches into the easement.

Minor easement encroachments:

Three additional encroachment areas will remain unresolved and have been documented as red lines on the record drawings. The encroachments are as follows:

UT4 Reach 1:

- Sta. 404+30 – 404+33: Upstream of the crossing in the right floodplain, the riprap headwall encroaches 3 LF into the easement. The encroachment will remain in place and the length of the encroachment has been deducted from the total reach length.

UT6:

- Sta. 605+24 – 605+26: Upstream of the crossing, the riprap apron at the pipe inlet encroaches 2 LF into the easement. The encroachment will remain in place and the length of the encroachment has been deducted from the total reach length.
- Sta. 605+71 – 605+72: Downstream of the crossing to the right of the outlet, the riprap headwall encroaches 1 LF into the easement. The encroachment will remain in place and the length of the encroachment has been deducted from the total reach length.

4.2.2 Fence Line Encroachments

The following fencing encroachments were documented on the record drawings as red lines; however, they will be corrected during MY1 maintenance activities. See sheets 3.1 and 3.2 of the record drawings for red line depictions. The fence line encroachments are as follows:

UT to Crab Creek:

- Sta. 100+09 – 100+60: Fence line to be removed. It was inadvertently installed from easement corner in right floodplain to easement boundary along stream centerline. Cattle have been excluded on adjacent parcels.
- Sta. 104+50 – 106+11: A fence post was accidently left out along the easement and led to an encroachment where the missing post should have been placed. The fence line will be moved outside of easement boundary in right floodplain.

4.3 Baseline Data Assessment

MY0 was conducted between October 2021 and February 2022. Cross-section and longitudinal profile data collection were completed by December 15, 2021. The collection of sediment and vegetative data were completed by February 2022. Locations of the monitoring features are depicted in Figures 3.0 through 3.4 in Appendix 1. The first annual monitoring assessment (MY1) will be completed in the fall of 2022, at least 6 months after the MY0 assessment. The streams will be monitored for a total of seven years, with the final monitoring activities scheduled for 2028.

4.3.1 Morphological State of the Channel

Please refer to Appendix 2 for summary data tables, morphological plots, and stream photographs.

Dimension

The MY0 dimension numbers closely match the design parameters with minor variations. All restored B-channel types have higher-than-expected entrenchment ratios. A broader floodplain was able to be achieved

during final grading through priority 1 restoration to support existing wetlands. Channels UT1A Reach 1, UT4 Reach 1, UT5 Reach 2, and UT7 classify as unconfined, high entrenchment, B-channel types. On some reaches the as-built parameters slightly exceed design parameters to account for the expected narrowing of the channel as vegetation becomes established. While UT to Crab Creek Reach 2's width and cross-sectional area are slightly smaller than design. This likely due to channel confinement from hillside slope in the left floodplain. The channel isn't showing any signs of instability, and its width to depth ratio is consistent with design parameters. On-site as-built reviews showed no visual indicators of lateral instability.

Pattern and Profile

The MY0 profiles generally match the profile design parameters. Variations from the design profile often reflect field changes during construction as a result of field conditions and do not constitute a problem or indicate a need for remedial actions. Channels profiles will continue to be assessed visually during the CCPV Site walks.

Substrate

Reach-wide pebble counts were performed on each restoration reach to establish stream classification at baseline conditions, and riffle 100-count substrate sampling was collected at each surveyed riffle cross-section to characterize pavement at as-built. Sediment analysis results show most reaches having a median particle size classification of medium to coarse gravel. Variations immediately after construction are normal because coarser materials are used to provide immediate grade control on the newly constructed channel. Over time, the channel will continue to move gravels and finer sediments into the system creating a mix of coarse substrate in the riffles and fine sediments in the pools. On-site as-built reviews showed no visual indicators of instability within riffle or pools.

Photo Documentation

Photographs illustrate the Site's vegetation and morphological stability on an annual basis and that crossings were installed as designed.

Bankfull Events

Bankfull events recorded following completion of construction will be reported in the Year 1 monitoring report.

Baseflow Monitoring

Intermittent streamflow data following completion of construction will be reported in the Year 1 monitoring report.

4.3.2 Vegetation

Woody Vegetation Monitoring Plots

After the final Double H Site Mitigation Plan (Wildlands, 2020) was submitted in November 2020, the IRT continued discussions about the planting plan. The IRT approved the final planting plan in August 2021 (Browning, 2021). At the time of planting in January 2022, two species, cucumber magnolia (*Magnolia acuminata*) and sweet birch (*Betula lenta*), from the final IRT approved species list were replaced due to the inability to source the stems. The species were replaced by red mulberry (*Morus rubra*) and painted buckeye (*Aesculus sylvatica*) in the buffer planting area. Both substitute species were planted at the same density as the original proposed species and have been noted as proposed in the vegetation plot data tables 9a-9c.

For MY0, the planted stem density for the permanent and mobile vegetation plots ranged from 364 to 688 stems/acre and exceeded the interim measure of vegetative success of at least 320 planted stems per acre required at the end of the third monitoring year. Summary data and photographs of each plot can be found in Appendix 3. Deviations from the Mitigation Plan's planting plan are outlined in Section 4.17 and planting plan correspondence is included in Appendix 5.

Bog Herbaceous Wetland Vegetation Plots

The herbaceous bog turtle habitat as visually monitored in MY0. Both bog vegetation plots had at least 80% vegetated cover and the dominants species had a wetland indicator status of FACW. There were no native woody species or invasive species observed in either plot. During the time of data collection in January 2022, snow cover obscured portions of the plots making it difficult to identify species and estimate coverage. However, in both plots Juncus effusus was clearly dominant as is clearly visible in the bog vegetation plot photos. More detailed herbaceous data will be reported in the Year 1 monitoring report. Summary data and photographs of each plot can be found in Appendix 3.

4.3.3 Visual Assessments

Visual assessment data following completion of construction will be reported in the Year 1 monitoring report.

4.3.4 Wetland Hydrology

Wetland hydrology data following completion of construction will be reported in the Year 1 monitoring report.

Section 5.0 CREDIT RELEASE SCHEDULE

All credit releases will be based on the total credit generated as reported by the as-built survey of the mitigation site. Under no circumstances shall any mitigation project be debited until the necessary Department of the Army (DA) authorization has been received for its construction or the District Engineer (DE) has otherwise provided written approval for the project in the case where no DA authorization is required for construction of the mitigation project. The DE, in consultation with the Interagency Review Team (IRT), will determine if performance standards have been satisfied sufficiently to meet the requirements of the release schedules below. In cases where some performance standards have not been met, credits may still be released depending on the specifics of the case. Monitoring may be required to restart or be extended, depending on the extent to which the site fails to meet the specified performance standard. The release of project credits will be subject to the criteria described as follows:

Credit Release Schedule – Stream Credits – *Double H Farms Mitigation Site*

Credit Release Milestone	Release Activity	ILF/NCDMS	
		Interim Release	Total Released
2*	Completion of all initial physical and biological improvements made pursuant to the Mitigation Plan.	30%	30%
3	First year monitoring report demonstrates that channels are stable interim performance standards are being met.	10%	40%
4	Second year monitoring report demonstrates that channels are stable interim performance standards are being met.	10%	50%
5	Third year monitoring report demonstrates that channels are stable interim performance standards are being met.	10%	60%
6**	Fourth year monitoring report demonstrates that channels are stable interim performance standards are being met.	5%	65% (75%***)
7	Fifth year monitoring report demonstrates that channels are stable interim performance standards are being met.	10%	75% (85%***)
8**	Sixth year monitoring report demonstrates that channels are stable interim performance standards are being met.	5%	80% (90%***)
9	Seventh year monitoring report demonstrates that channels are stable performance standards have been met and project has received closeout approval.	10%	90% (100%***)

*For ILF sites (including all NCDMS projects), no initial release of credits (Milestone 1) is provided because ILF programs utilized advance credits, so no initial release is necessary to help fund site construction. To account for this, the 15% credit release associated with the first milestone (bank establishment) is held until the second milestone, so that the total credits release at the second milestone is 30%. In order for NCDMS to receive the 30% release (shown in the schedules as Milestone 2), they must comply with the credit release requirements stated in Section IV(I)(3) of the approved NCDMS Instrument.

**Please note that geomorphic and vegetation data may not be required with monitoring reports submitted during these monitoring years unless otherwise required by the Mitigation Plan or directed by the NCIRT.

***10% reserve of credits to be held back until the bankfull event performance standard has been met.

Section 6.0 REFERENCES

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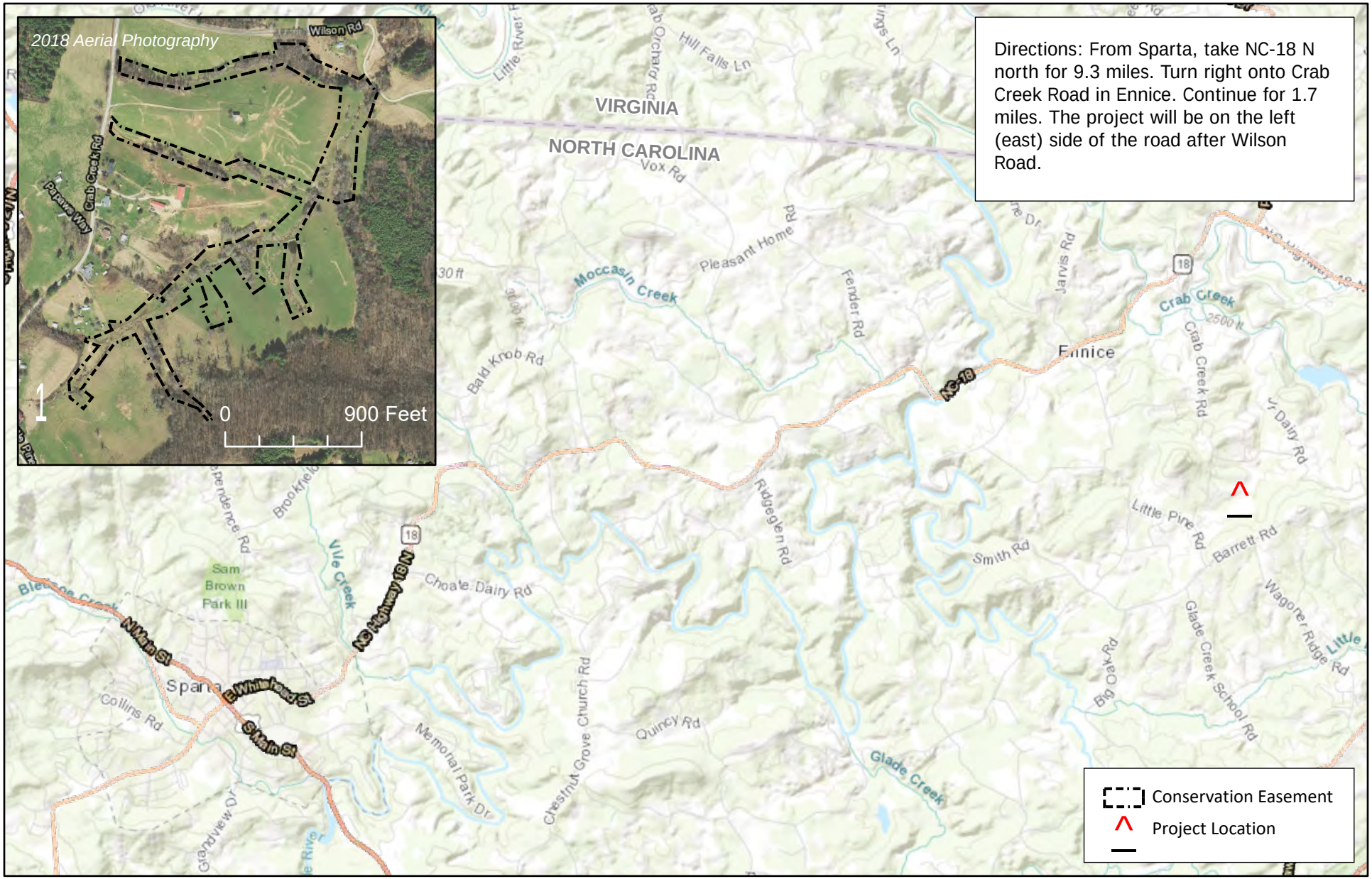
APPENDIX 1. General Figures, Tables, and Documentation



WILDLANDS ENGINEERING

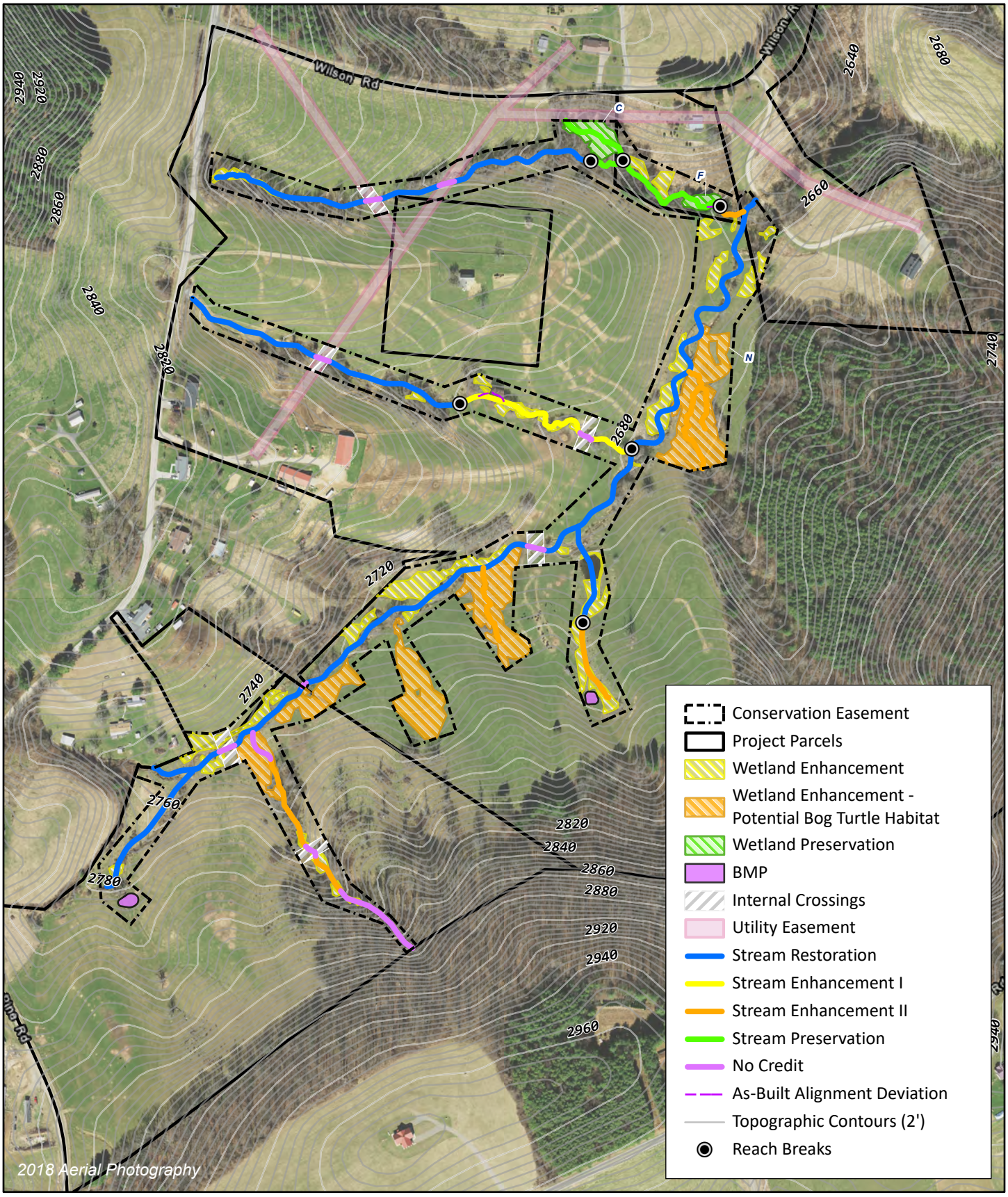
Environmental Quality

0 1 2 Miles

1

Figure 1 Project Vicinity Map
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 0 - 2022

Alleghany County, NC



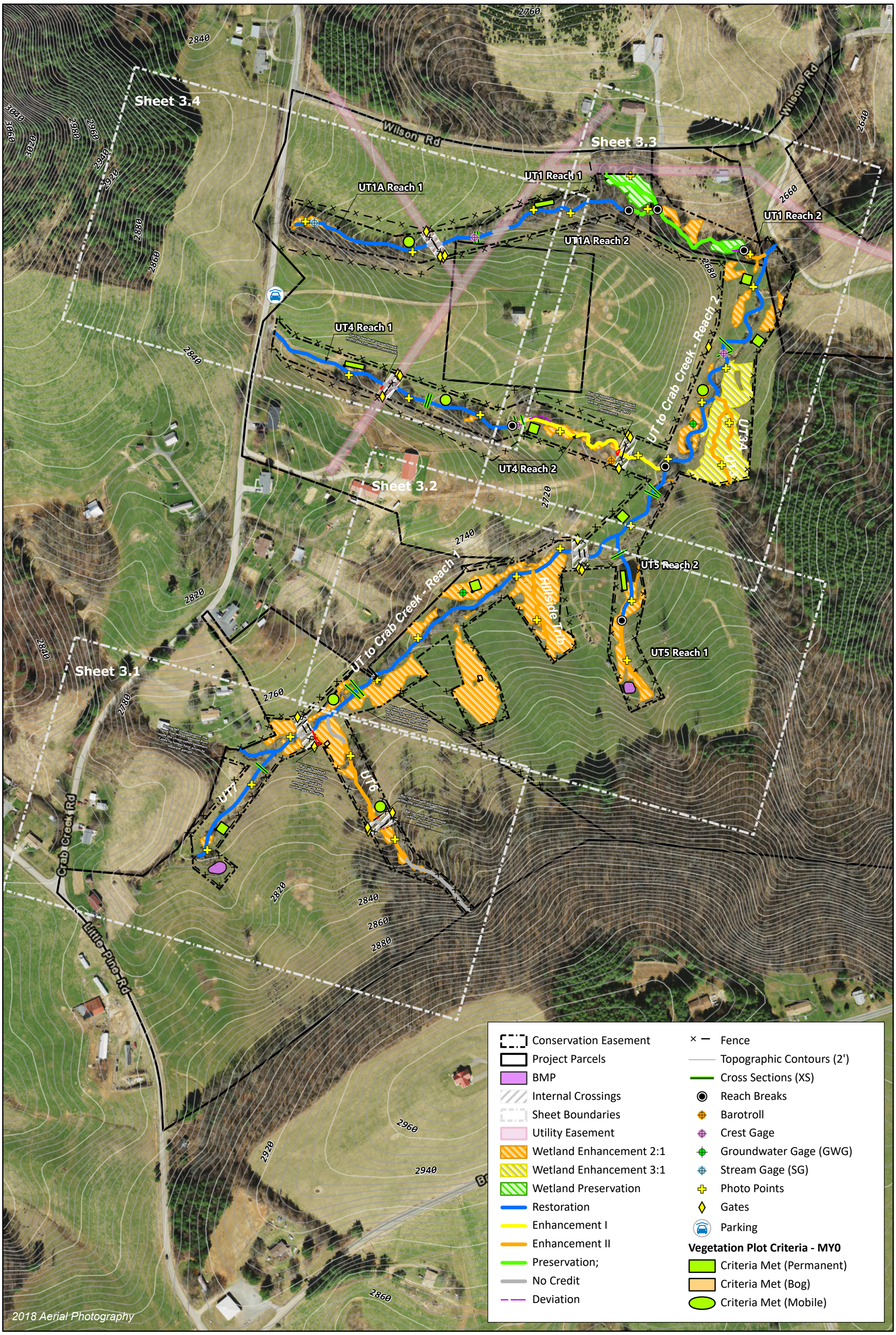
WILDLANDS ENGINEERING

NC Environmental Quality

0 400 Feet

Figure 2 Project Component / Asset Map
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 0 - 2022

Alleghany County, NC



WILDLANDS ENGINEERING

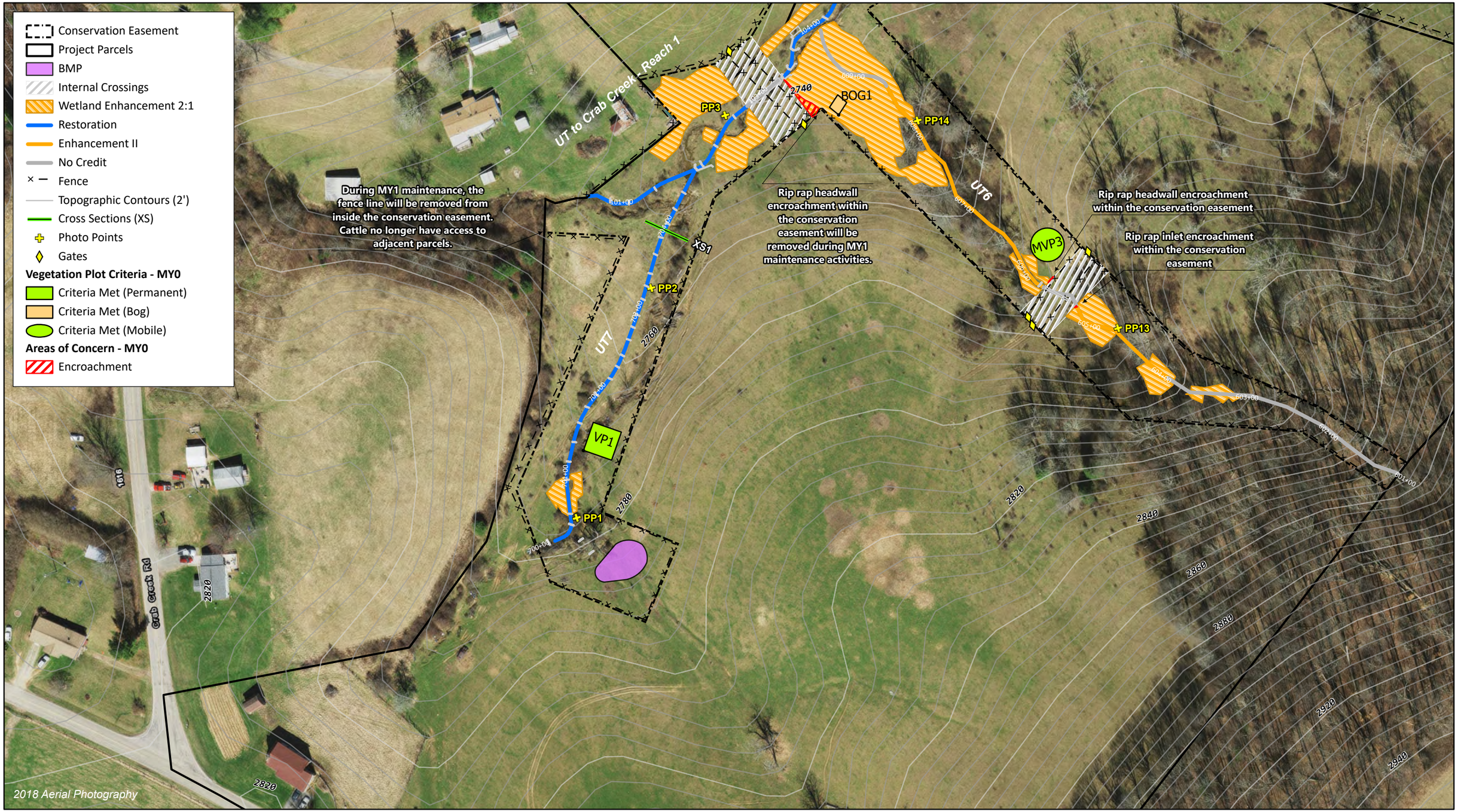
Environmental Quality

0 300 600 Feet

N

Figure 3.0 Monitoring Plan View Map
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 0 - 2022

Alleghany County, NC



WILDLANDS ENGINEERING

Environmental Quality

0 100 200 Feet

Figure 3.1 Monitoring Plan View Map
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 0 - 2022

Alleghany County, NC

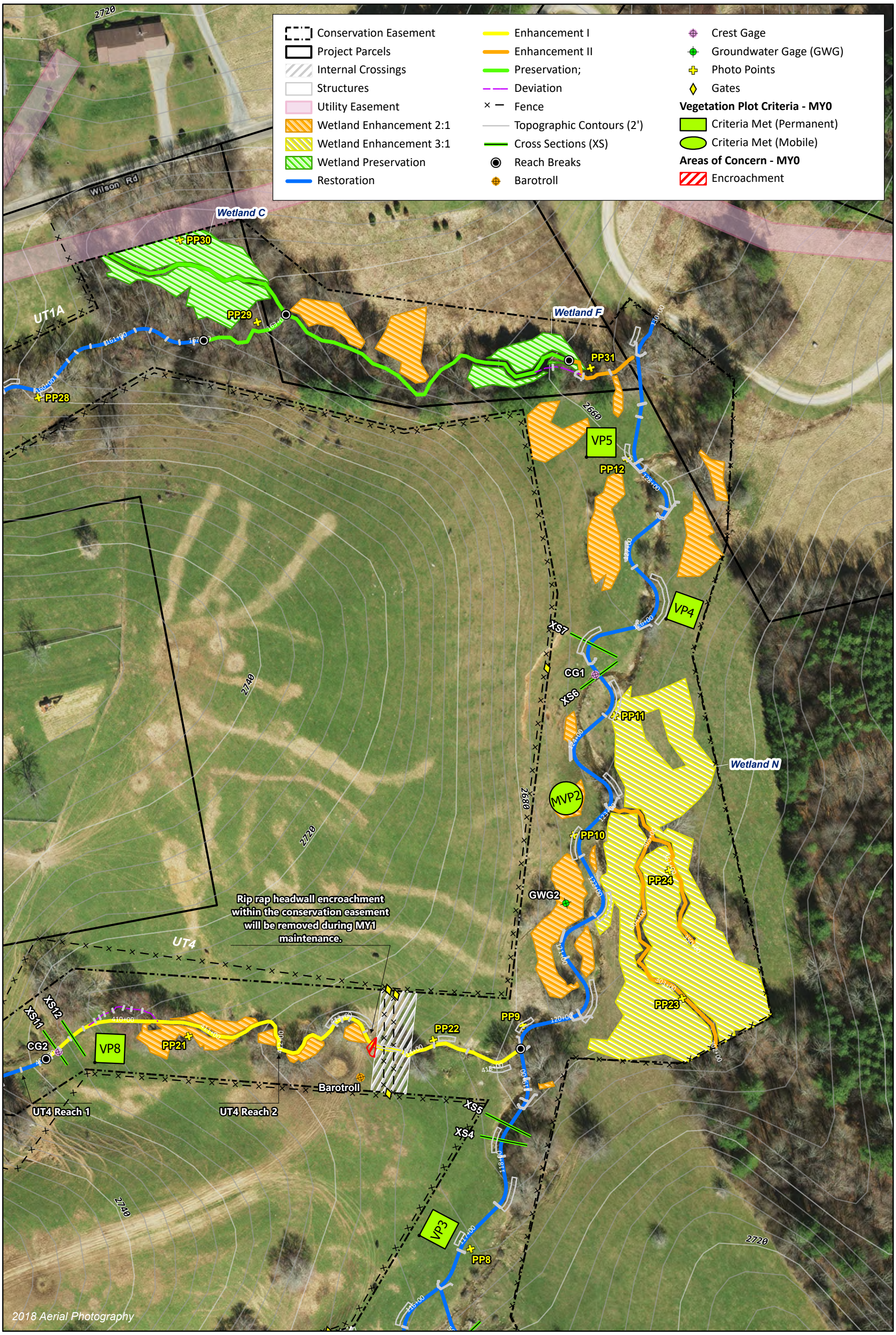
WILDLANDS ENGINEERING

Environmental Quality

0 100 200 Feet

Figure 3.2 Monitoring Plan View Map
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 0 - 2022

Alleghany County, NC



WILDLANDS ENGINEERING

Environmental Quality

0 100 200 Feet

Figure 3.3 Monitoring Plan View Map
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 0 - 2022

Alleghany County, NC

WILDLANDS ENGINEERING

NC Environmental Quality

0 100 200 Feet

Figure 3.4 Monitoring Plan View Map
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 0 - 2022

Alleghany County, NC

Table 1. Mitigation Assets and Components

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Project Components										
Project Area /Reach	**Existing Footage (LF) or Acreage**	**Mitigation Plan Footage/ Acreage[1, 3]**	**Mitigation Category**	**Restoration Level**	**Priority Level**	**Mitigation Ratio (X:1)**	**Mitigation Plan Credits**		**As-Built Footage/Acreage[1, 3,4]**	**Comments**
UT to Crab Creek Reach 1 and Reach 2	3,391	2,817.7	Cold	R	P1, P2	1.000	2817.700		2,817.000	N/A
UT1 Reach 1	745	619.1		P	N/A	10.000	61.910		606.000	
UT1 Reach 2		91.8		EII	N/A	5.000	18.360		84.000	
UT1A Reach 1	1,372	1,112.9		R	P1, P2	1.000	1112.900		1,114.000	
UT1A Reach 2		110.0		P	N/A	10.000	11.000		110.000	
UT3	365	365.5		EII	N/A	3.000	121.833		365.000	
UT3A	146	145.7		EII	N/A	3.000	48.561		146.000	
UT4 Reach 1	1,598	849.8		R	P1, P2	1.000	849.800		847.000	
UT4 Reach 2		588.6		EI	P1, P2, P3, P4	1.500	392.400		602.000	
UT5 Reach 1[2]	538	252.1		EII	N/A	2.500	100.840		252.000	
UT5 Reach 2		305.0		R	P1	1.000	305.000		305.000	
Hillside Tributary	251	248.1		EII	N/A	2.500	99.240		248.000	
UT6	745	283.0		P	N/A	N/A	0.000		283.000	
		422.4		EII	N/A	2.500	168.960		419.000	
UT7[2]	430	451.9		R	P1	1.000	451.900		452.000	
Wetlands C and F	0.308	0.308	RR	P	Preservation	10.000	0.031		0.303	
Wetland N	0.964	0.932		E	Enhancement	3.000	0.311		0.932	
All other Site Wetlands	3.99	3.618		E	Enhancement	2.000	1.809		3.637	

Notes:

1. Internal culvert crossings excluded from the credited stream footage.
2. No direct credit for BMP's.
3. UT1A contains an overhead powerline easement that has been excluded from the stream lengths.
4. The LF of rip-rap encroachment at the easement crossings as noted on the Figures located on UT to Crab Creek R1, UT4, and UT6 have been removed from the As-built stream lengths at MY0. All encroachments will be eliminated during MY1.

Project Credits							
Restoration Level	**Stream**			**Riparian Wetland**		**Non-Riparian Wetland**	**Coastal Marsh**
	Warm	**Cool**	**Cold**	**Riverine**	**Non-Riv**		
Restoration	N/A	N/A	5,537.300	N/A	N/A	N/A	N/A
Re-establishment				N/A	N/A	N/A	N/A
Rehabilitation				N/A	N/A	N/A	N/A
Enhancement				2.120	N/A	N/A	N/A
Enhancement I	N/A	N/A	392.400				
Enhancement II	N/A	N/A	557.800				
Creation				N/A	N/A	N/A	N/A
Preservation	N/A	N/A	72.910	0.031	N/A	N/A	
Totals	N/A	N/A	6,560.410	2.151	N/A	N/A	N/A

Table 2. Project Activity and Reporting History

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Activity or Report		Data Collection Complete	Completion or Delivery
404 Permit		January 2021	February 2021
Mitigation Plan		January 2018 - November 2020	November 2020
Final Design - Construction Plans		November 2020 - April 2021	April 2021
Construction		April - September 2021	September 2021
Temporary S&E mix applied to entire project area[1]		April - September 2021	September 2021
Permanent seed mix applied to reach/segments[1]		April - September 2021	September 2021
Bare root and live stake plantings for reach/segments		January 2022	January 2022
Baseline Monitoring (Year 0)	Stream Survey	October 2021 - February 2022	February 2022
	Vegetation Survey	January 2022 - February 2022	
	Remediation	N/A	N/A
	Encroachment	April - September 2021	March 2022
Year 1 Monitoring	Stream Survey		
	Vegetation Survey		
	Remediation		
	Encroachment		
Year 2 Monitoring	Stream Survey		
	Vegetation Survey		
	Remediation		
	Encroachment		
Year 3 Monitoring	Stream Survey		
	Vegetation Survey		
	Remediation		
	Encroachment		
Year 4 Monitoring	Stream Survey		
	Vegetation Survey		
	Remediation		
	Encroachment		
Year 5 Monitoring	Stream Survey		
	Vegetation Survey		
	Remediation		
	Encroachment		
Year 6 Monitoring	Stream Survey		
	Vegetation Survey		
	Remediation		
	Encroachment		
Year 7 Monitoring	Stream Survey		
	Vegetation Survey		
	Remediation		
	Encroachment		

[1]Seed and mulch is added as each section of construction is completed.

Table 3. Project Contact Table

Double H Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Designers Aaron Earley, PE, CFM	**Wildlands Engineering, Inc.** 1430 South Mint Street, Suite 104 Charlotte, NC 28203 704.332.7754
Construction Contractors	**Wildlands Construction, Inc.** 312 W. Millbrook Rd, Suite 225 Raleigh, NC 27609
Planting Contractor	**Bruton Natural Systems, Inc.** PO Box 1197 Fremont, NC 27830
Seeding Contractor	**Wildlands Construction, Inc.** 312 W. Millbrook Rd, Suite 225 Raleigh, NC 27609
Seed Mix Sources	**Garrett Wildflower Seed Farm**
Nursery Stock Suppliers	**Dykes and Sons Nursery**
Bare Roots Live Stakes	**Bruton Natural Systems, Inc.**
Herbaceous Plugs	**Wetland Plants Inc.**
Monitoring Performers	**Wildlands Engineering, Inc.**
Monitoring, POC	Kristi Suggs (704) 332.7754 x.110

Table 4. Project Information and Attributes
Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Project Information	
Project Name	Double H Farms Mitigation Site
	Alleghany County
Project Area (acres)	21.0
Project Coordinates (latitude and longitude)	36° 31' 52.23"N 80° 59' 18.62"W
Planted Acreage (Acre of Woody Stems Planted)	17.7 acres

Project Watershed Summary Information	
Physiographic Province	Blue Ridge Physiographic Province
River Basin	New River
USGS Hydrologic Unit 8-digit	5050001
USGS Hydrologic Unit 14-digit	5050001030020
DWR Sub-basin	05-07-03
Project Drainage Area (acres)	274
Project Drainage Area Percentage of Impervious Area	0.5%
2011 NLCD Land Use Classification	Forest (35%), Agriculture (57%), Developed (8%)

Reach Summary Information

Parameters	UT to Crab Creek R1	UT to Crab Creek R2	UT1A R1	UT1A R2	UT1 R1	UT1 R2	UT3	UT3A	UT4 R1	UT4 R2	UT5 R1	UT5 R2	UT6	UT7	Hillside Tributary
Length of reach (linear feet) - Post-Restoration	2,817		1,114	110	606	84	365	146	847	602	252	305	419	452	248
Valley confinement (Confined, moderately confined, unconfined)	Moderately Confined	Unconfined	Confined	Moderately Confined	Unconfined	Moderately confined	Unconfined	Unconfined	Confined	Moderately Confined	Confined	Moderately Confined	Confined	Confined	Unconfined
Drainage area (acres)	127	274	14		47		49	1	27	35	10		12	23	4
Perennial, Intermittent, Ephemeral	P	P	I/P	P	P	P	P	P	P	P	P	P	I/P	P	P
NCDWR Water Quality Classification	Class C; Tr; HQW														
Morphological Description (stream type) - Pre-Restoration	C4b	C4b	A4	N/A	N/A	N/A	N/A	N/A	B4a	B4a	N/A	B4a	N/A	B4a	N/A
Morphological Description (stream type) - Post-Restoration	B4	C4	A4a+/B4a	N/A	N/A	N/A	N/A	N/A	B4a	B4a	N/A	B4a	N/A	B4a	N/A
Evolutionary trend (Simon's Model) - Pre- Restoration	III	IV	III	VI	VI	IV->V	VI	VI	III	IV	V	V	VI	III	V
FEMA classification	None														

Regulatory Considerations

Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States - Section 404	Yes	Yes	USACE Action ID #SAW-2018-01771
Waters of the United States - Section 401	Yes	Yes	DWR# 20181270
Division of Land Quality (Erosion and Sediment Control)	Yes	Yes	NPDES Construction Stormwater General Permit NCG010000
Endangered Species Act	Yes	Yes	Categorical Exclusion Document in Mitigation Plan
Historic Preservation Act	Yes	Yes	Categorical Exclusion Document in Mitigation Plan
Coastal Zone Management Act (CZMA)/Coastal Area Management Act	No	N/A	N/A
FEMA Floodplain Compliance	No	N/A	N/A
Essential Fisheries Habitat	No	N/A	N/A

Table 5a. Monitoring Component Summary

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Parameter	Monitoring Feature	Quantity/Length by Reach							Frequency	Notes
		UT to CC Reach 1	UT to CC Reach 2	UT1 Reach 1	UT1 Reach 2	UT1A Reach 1	UT1A Reach 2	Hillside Tributary		
Dimension	Riffle Cross-sections	2	1	N/A	N/A	1	N/A	N/A	Year 1, 2, 3, 5, and 7	1
	Pool Cross-sections	2	1	N/A	N/A	1	N/A	N/A		
Pattern	Pattern	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2
Profile	Longitudinal Profile	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Substrate	Reach wide (RW) Pebble Count	1 RW	1 RW	N/A	N/A	1 RW	N/A	N/A	N/A	3
Hydrology	Crest Gage (CG) and/or Stream gage (SG)	1 CG		N/A	N/A	1 CG & 1 SG	N/A	N/A	Semi-Annual	4
Vegetation	Total Plots (Permanent Woody Plot/ Mobile Woody Plot/ Permanent Bog Herbaceous Plot)	6 (3/2/1)		N/A	1 (1/0/0)	2 (1/1/0)	N/A	N/A	Year 1, 2, 3, 5, and 7	5
Visual Assessment		Y	Y	N/A	Y	Y	N/A	N/A	Semi-Annual	
Exotic and nuisance vegetation									Semi-Annual	6
Project Boundary									Semi-Annual	7
Reference Photos	Photographs	6	4	1	1	4	1	1	Annual	

1. Cross-sections are permanently marked with rebar to establish location. Surveys include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg.

2. Pattern and profile are assessed visually during semi-annual site visits. Longitudinal profile is collected during as-built baseline monitoring survey only, unless observations indicate widespread lack of vertical stability (greater than 10% of reach is affected) and profile survey is warranted in additional years to monitor adjustments or survey repair work.

3. Riffle 100-count and reachwide substrate sampling are collected during the baseline monitoring only (IRT Technical Workgroup Meeting 2021 and H. Tsomides email correspondence).

4. Crest gages and/or stream flow gages are monitored using automated pressure transducers. Tranducers are set to record bank full events or stream flow at least every 3 hours and are inspected quarterly or semi-annually. Evidence of bankfull and stream flow events is documented with a photo when possible.

5. Both mobile and permanent vegetation plots are utilized to evaluate the vegetation performance for the open areas planted. 2% of the open planted acreage is monitored with permanent and mobile plots. Permanent vegetation monitoring plot assessments follow CVS Level 2 protocols. Mobile vegetation monitoring plot assessments document number of planted stems and species using a circular or 100 m2 square/rectangular plot. Planted shaded areas are visually assessed. Potential bog turtle habitat wetlands are monitored with herbaceous plots.

6. Locations of exotic and nuisance vegetation will be mapped as observed.

7. Locations of vegetation damage, boundary encroachments, etc. will be mapped as observed.

Table 5b. Monitoring Component Summary

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Parameter	Monitoring Feature	Quantity/Length by Reach								Frequency	Notes
		UT3	UT3A	UT4 Reach 1	UT4 Reach 2	UT5 Reach 1	UT5 Reach 2	UT6	UT7		
Dimension	Riffle Cross-sections	N/A	N/A	1	1	N/A	1	N/A	1	Year 1, 2, 3, 5, and 7	1
	Pool Cross-sections	N/A	N/A	1	1	N/A	0	N/A	0		
Pattern	Pattern	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2
Profile	Longitudinal Profile	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Substrate	Reach wide (RW) pebble count	N/A	N/A	1 RW	1 RW	N/A	1 RW	N/A	N/A	N/A	3
Hydrology	Crest Gage(CG) and/or Transducer (SG)	N/A	N/A	1 CG		N/A	N/A	N/A	N/A	Semi- Annual	4
Vegetation	Total Plots (Permanent Woody Plot/ Mobile Woody Plot/ Permanent Bog Herbaceous Plot)	7 (4/2/1)								Year 1, 2, 3, 5, and 7	5
Visual Assessment		Y	Y	Y	Y	Y	Y	Y	Y	Semi- Annual	
Exotic and nuisance vegetation										Semi- Annual	6
Project Boundary										Semi- Annual	7
Reference Photos	Photographs	1	1	3	2	1	1	2	2	Annual	

1. Cross-sections are permanently marked with rebar to establish location. Surveys include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg.
2. Pattern and profile are assessed visually during semi-annual site visits. Longitudinal profile is collected during as-built baseline monitoring survey only, unless observations indicate widespread lack of vertical stability (greater than 10% of reach is affected) and profile survey is warranted in additional years to monitor adjustments or survey repair work.
3. Riffle 100-count and reachwide substrate sampling are collected during the baseline monitoring only (IRT Technical Workgroup Meeting 2021 and H. Tsomides email correspondence).
4. Crest gages and/or stream flow gages are monitored using automated pressure transducers. Tranducers are set to record bank full events or stream flow at least every 3 hours and are inspected quarterly or semi-annually. Evidence of bankfull and stream flow events is documented with a photo when possible.
5. Both mobile and permanent vegetation plots are utilized to evaluate the vegetation performance for the open areas planted. 2% of the open planted acreage is monitored with permanent and mobile plots. Permanent vegetation monitoring plot assessments follow CVS Level 2 protocols. Mobile vegetation monitoring plot assessments document number of planted stems and species using a circular or 100 m2 square/rectangular plot. Planted shaded areas are visually assessed. Potential bog turtle habitat wetlands are monitored with herbaceous plots.
6. Locations of exotic and nuisance vegetation will be mapped as observed.
7. Locations of vegetation damage, boundary encroachments, etc. will be mapped as observed.

Table 6. Baseline Stream Data Summary
Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Pre-Existing Condition																				
Parameter	**UT to Crab Creek Reach 1**			**UT to Crab Creek Reach 2**			**UT1A Reach 1**			**UT4 Reach 1**			**UT4 Reach 2**			**UT5 Reach 2**			**UT7**		
	Min	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**
Dimension and Substrate - Riffle																				
Bankfull Width (ft)	10.2		1	8.9		1	2.8		1	7.6		1	12.7		1	2.1		1	6.3		1
Floodprone Width (ft)	43		1	26		1	3		1	8		1	34		1	14		1	12		1
Bankfull Mean Depth (ft)	0.5		1	0.9		1	0.5		1	0.6		1	0.7		1	0.4		1	0.6		1
Bankfull Max Depth (ft)	0.9		1	1.3		1	0.7		1	1.2		1	1.3		1	0.8		1	1.0		1
Bankfull Cross-sectional Area (ft^2)	4.8		1	7.9		1	1.5		1	4.3		1	8.4		1	0.9		1	4.0		1
Width/Depth Ratio	21.9		1	10.2		1	5.2		1	13.2		1	19.1		1	4.8		1	10.0		1
Entrenchment Ratio[1]	4.2		1	2.9		1	1.2		1	1.1		1	2.7		1	6.7		1	1.8		1
Bank Height Ratio	1.7		1	2.3		1	6.8		1	1.7		1	1.0		1	1.0		1	3.5		1
Max part size (mm) mobilized at bankfull	---		1	---		1	---		1	---		1	---		1	---		1	---		1
Rosgen Classification	C4b			C4b			B4a			B4a			B4a			B4a			B4a		
Bankfull Discharge (cfs)	20			40			6			7			9			6			7		
Sinuosity	1.20			1.20			1.02			1.03			1.09			1.02			1.05		
Bankfull/Channel Slope (ft/ft)[2]	0.0370			0.0245			0.0645			0.0569			0.0499			0.0840			0.0741		

Design																				
Parameter	**UT to Crab Creek Reach 1**			**UT to Crab Creek Reach 2**			**UT1A Reach 1**			**UT4 Reach 1**			**UT4 Reach 2**			**UT5 Reach 2**			**UT7**		
	Min	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**
Dimension and Substrate - Riffle																				
Bankfull Width (ft)	8.0		1	11.0		1	4.3		1	5.0		1	5.0		1	4.3		1	4.5		1
Floodprone Width (ft)	16		1	24	110+	1	9		1	10		1	10		1	9		1	---		1
Bankfull Mean Depth (ft)	0.5		1	0.8		1	0.3		1	0.4		1	0.4		1	0.3		1	0.3		1
Bankfull Max Depth (ft)	0.8		1	1.2		1	0.5		1	0.5		1	0.5		1	0.4		1	---		1
Bankfull Cross-sectional Area (ft^2)	4.3		1	8.7		1	1.4		1	1.9		1	1.9		1	1.2		1	1.5		1
Width/Depth Ratio	14.8		1	13.9		1	13.2		1	13.3		1	13.3		1	15.9		1	13.5		1
Entrenchment Ratio[1]	2.0		1	2.2	10+	1	2.0		1	2.0		1	2.0		1	2.0		1	1.4+		1
Bank Height Ratio	1.0		1	1.0		1	1.0		1	1.0		1	1.0		1	1.0		1	1.0-1.1		1
Max part size (mm) mobilized at bankfull	237.0		1	130.0		1	180.0		1	214.0		1	208.0		1	95.0		1	132.0		1
Rosgen Classification	B4			C4			B4a			B4a			B4a			B4a			B4a		
Bankfull Discharge (cfs)	20			40			6			7			9			5			7		
Sinuosity	1.05			1.28			1.03			1.05			1.17			1.02			1.04		
Bankfull/Channel Slope (ft/ft)[2]	0.0380			0.0170	0.0440		0.0650	0.1760		0.0700			0.0670			0.0310	0.1150		0.0410	0.0740	

As-Built/ Baseline																				
Parameter	**UT to Crab Creek Reach 1**			**UT to Crab Creek Reach 2**			**UT1A Reach 1**			**UT4 Reach 1**			**UT4 Reach 2**			**UT5 Reach 2**			**UT7**		
	Min	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**
Dimension and Substrate - Riffle																				
Bankfull Width (ft)	7.8	12.0	2	8.1		1	4.2		1	6.6		1	5.9		1	4.3		1	5.3		1
Floodprone Width (ft)	50	66	2	42		1	28		1	31		1	34		1	24		1	52		1
Bankfull Mean Depth (ft)	0.6	0.7	2	0.6		1	0.4		1	0.4		1	0.5		1	0.3		1	0.5		1
Bankfull Max Depth (ft)	0.9	1.3	2	1.0		1	0.8		1	0.8		1	0.9		1	0.6		1	1.1		1
Bankfull Cross-sectional Area (ft^2)[1]	4.4	8.3	2	4.7		1	1.6		1	2.5		1	2.9		1	1.3		1	2.6		1
Width/Depth Ratio	13.7	17.4	2	14.0		1	11.5		1	17.1		1	11.9		1	14.4		1	10.6		1
Entrenchment Ratio[1]	4.2	8.4	2	5.1		1	6.5		1	4.7		1	5.8		1	5.6		1	9.9		1
Bank Height Ratio	1.0		2	1.0		1	1.0		1	1.0		1	1.0		1	1.0		1	1.0		1
Max part size (mm) mobilized at bankfull	63.0	79.0	2	39.0		1	86.0		1	78.0		1	95.0		1	61.0		1	86.0		1
Rosgen Classification	B4			C4b			B4a			B4a			B4a			B4a			B4a		
Bankfull Discharge (cfs)	21.3	46.4		17.9			8.1			12.8			16.7			5.5			14.2		
Sinuosity	0.913			0.913			1.05			1.02			1.39			0.984			0.985		
Bankfull/Channel Slope (ft/ft)[2]	0.0382			0.0227			0.0838			0.0681			0.0664			0.0696			0.0634		

1. ER for the baseline/monitoring parameters are based on the width of the cross-section, in lieu of assuming the width across the floodplain.
2. Channel slope is calculated from the surface of the channel bed rather than water surface.
(---): Data was not provided, N/A: Not Applicable

APPENDIX 2. Morphological Summary Data and Plots

Table 7. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)
Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

	UT7 Cross-Section 1 Riffle								UT to Crab Creek R1 Cross-Section 2 Riffle								UT to Crab Creek R1 Cross-Section 3 Pool								UT to Crab Creek R1 Cross-Section 4 Pool							
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2749.69								2730.96								2730.03								2682.39							
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0								1.0								---								---							
Thalweg Elevation (ft)	2748.62								2730.02								2728.13								2679.95							
LTOB[2] Elevation (ft)	2749.69								2730.96								2730.03								2682.39							
LTOB[2] Max Depth (ft)	1.1								0.9								1.9								2.4							
LTOB[2] Cross Sectional Area (ft^2)	2.6								4.4								11.7								15.7							
	UT to Crab Creek R1 Cross-Section 5 Riffle								**UT to Crab Creek R2 Cross-Section 6 Riffle**								**UT to Crab Creek R2 Cross-Section 7 Pool**								**UT5 R2 Cross-Section 8 Riffle**							
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2681.84								2665.48								2664.94								2692.20							
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0								1.0								---								1.0							
Thalweg Elevation (ft)	2680.54								2664.48								2662.45								2691.63							
LTOB[2] Elevation (ft)	2681.84								2665.48								2664.94								2692.20							
LTOB[2] Max Depth (ft)	1.3								1.0								2.5								0.6							
LTOB[2] Cross Sectional Area (ft^2)	8.3								4.7								12.1								1.3							
	UT4 R1 Cross Section 9 Pool								**UT4 R1 Cross Section 10 Riffle**								**UT4 R2 Cross-Section 11 Riffle**								**UT4 R2 Cross-Section 12 Pool**							
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2739.34								2738.79								2716.79								2715.36							
Bank Height Ratio - Based on AB Bankfull[1] Area	---								1.0								1.0								---							
Thalweg Elevation (ft)	2737.85								2738.03								2715.84								2713.31							
LTOB[2] Elevation (ft)	2739.34								2738.79								2716.79								2715.36							
LTOB[2] Max Depth (ft)	1.5								0.8								0.9								2.1							
LTOB[2] Cross Sectional Area (ft^2)	4.7								2.5								2.9								7.7							
	UT1A R1 Cross-Section 13 Riffle								**UT1A R1 Cross-Section 14 Pool**																								
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**																
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2721.85								2721.51																							
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0								---																							
Thalweg Elevation (ft)	2721.02								2719.80																							
LTOB[2] Elevation (ft)	2721.85								2721.51																							
LTOB[2] Max Depth (ft)	0.8								1.7																							
LTOB[2] Cross Sectional Area (ft^2)	1.6								5.6																							

[1]Bank Height Ratio (BHR) takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation.

[2]LTOB Area and Max depth - These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

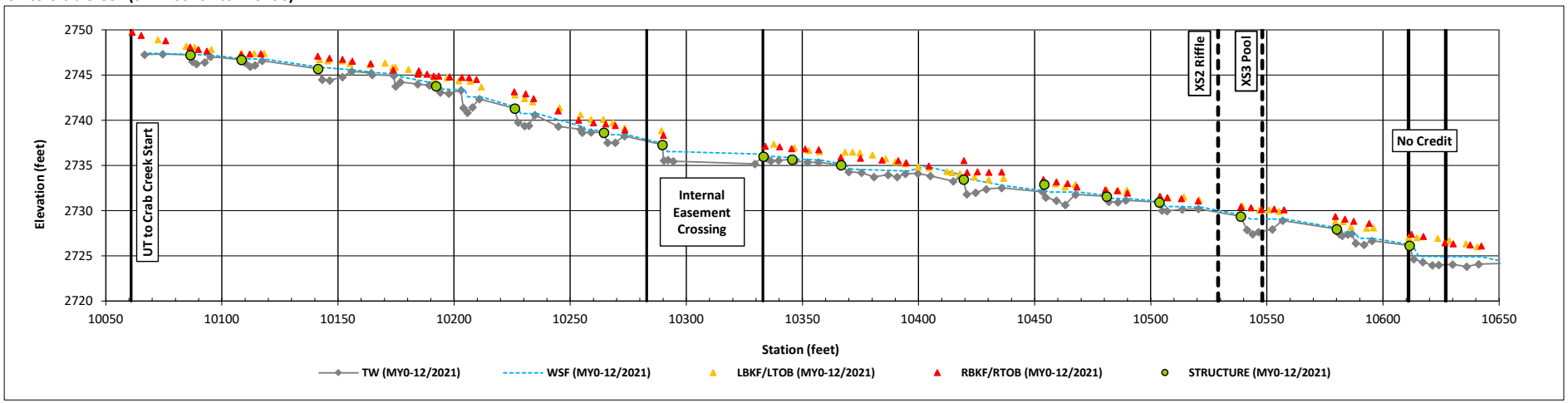
Longitudinal Profile Plots

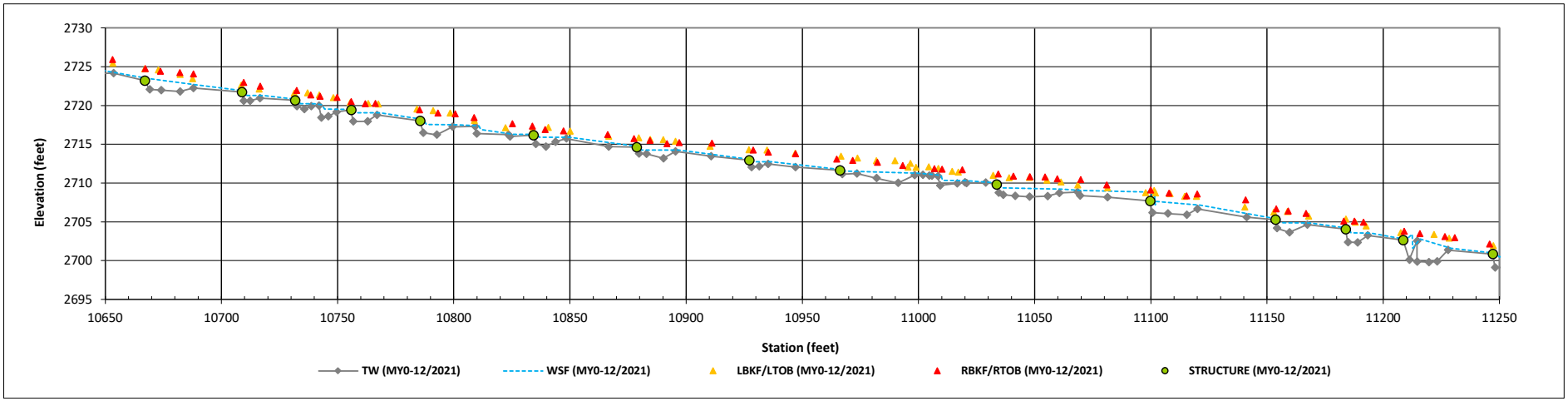
Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 0 - 2022

UT to Crab Creek (STA 100+61 to 129+96)





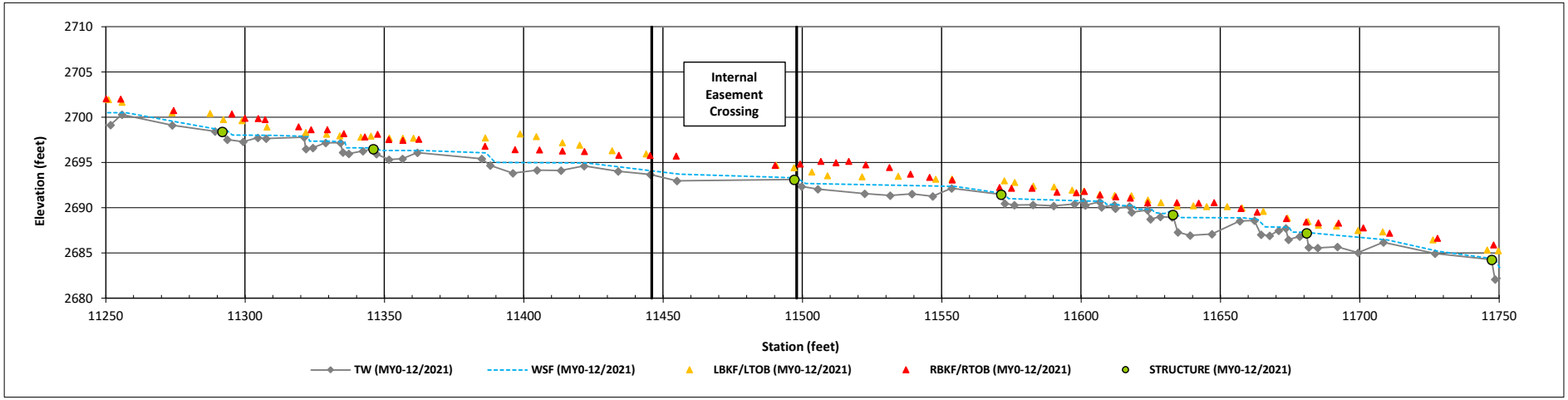
Longitudinal Profile Plots

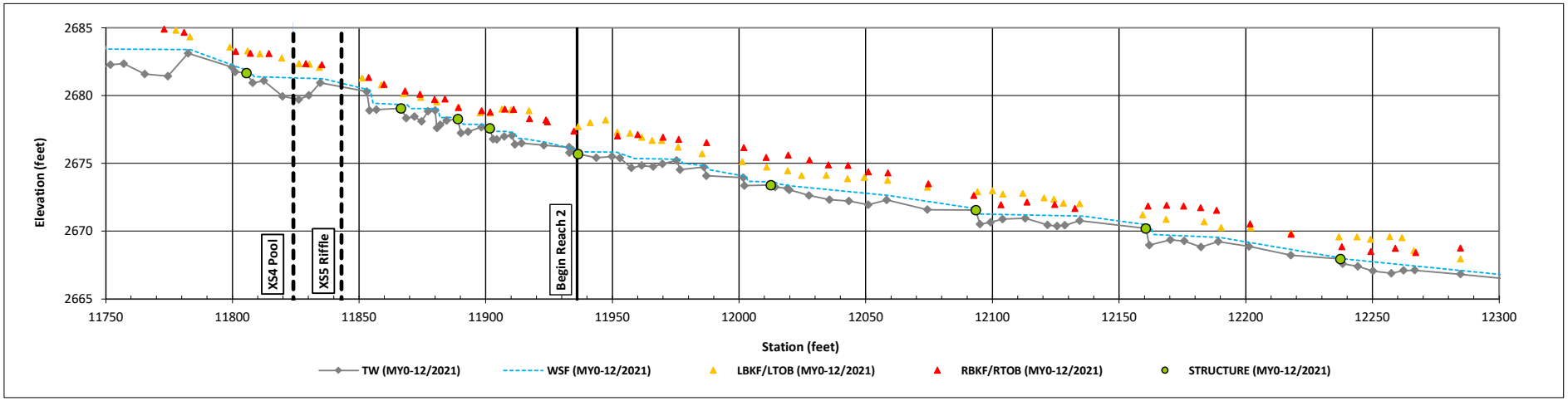
Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 0 - 2022

UT to Crab Creek (STA 100+61 to 129+96)





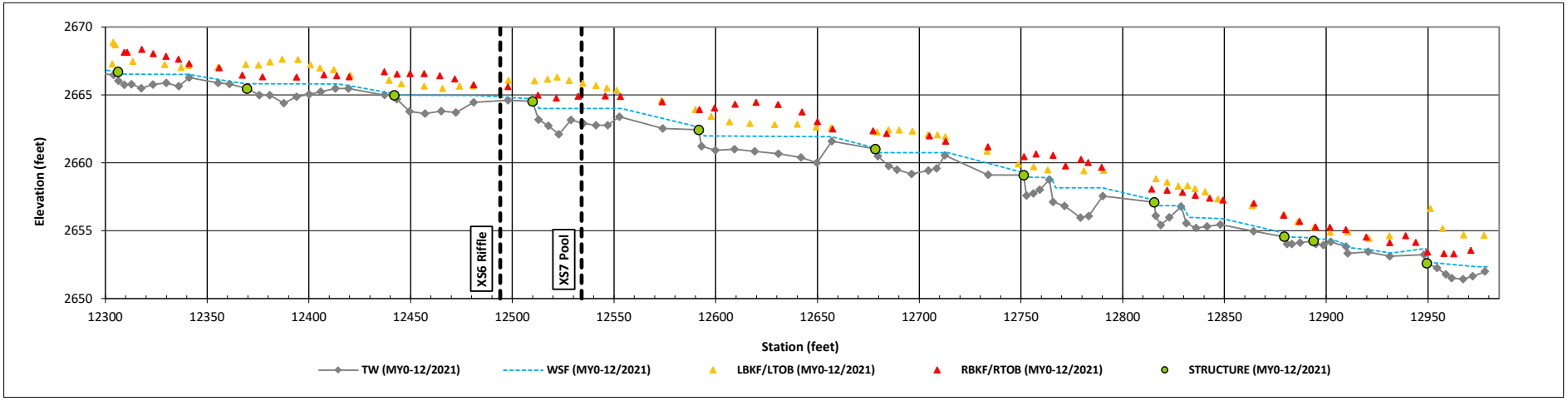
Longitudinal Profile Plots

Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 0 - 2022

UT to Crab Creek (STA 100+61 to 129+96)



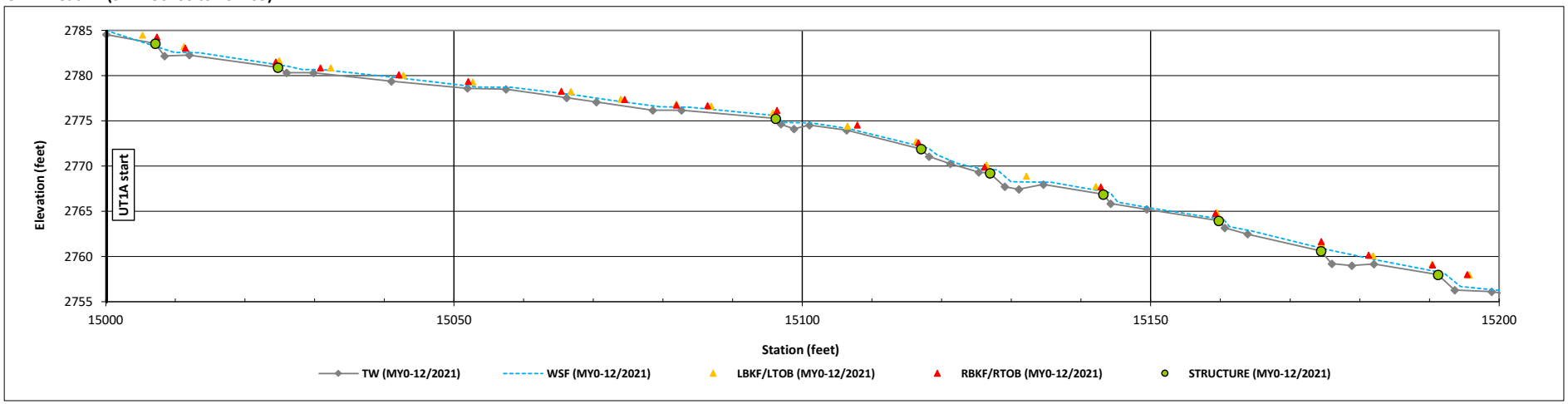
Longitudinal Profile Plots

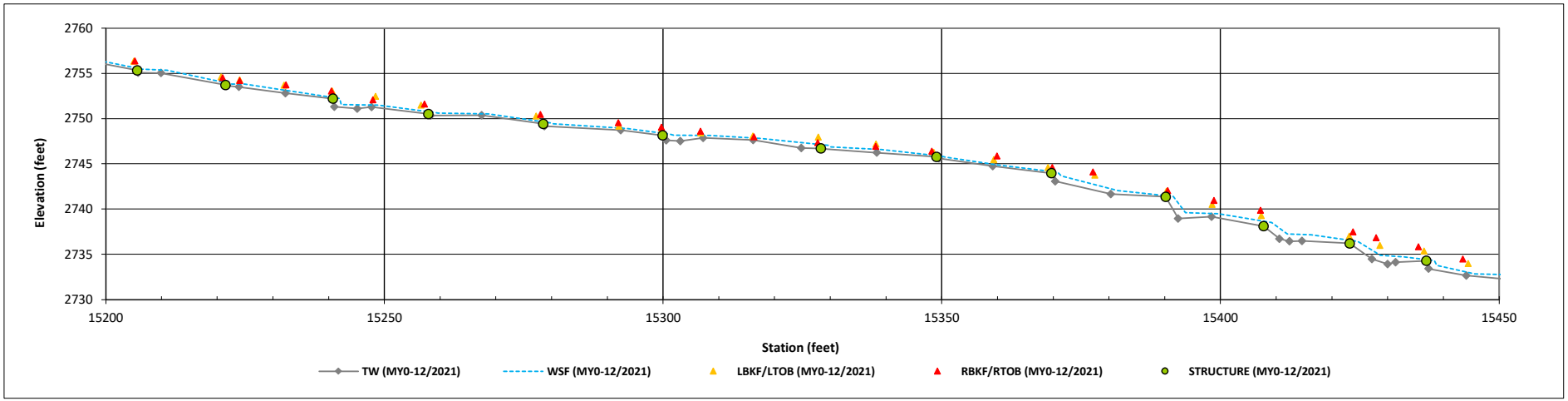
Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 0 - 2022

UT1A Reach 1 (STA 150+00 to 162+05)





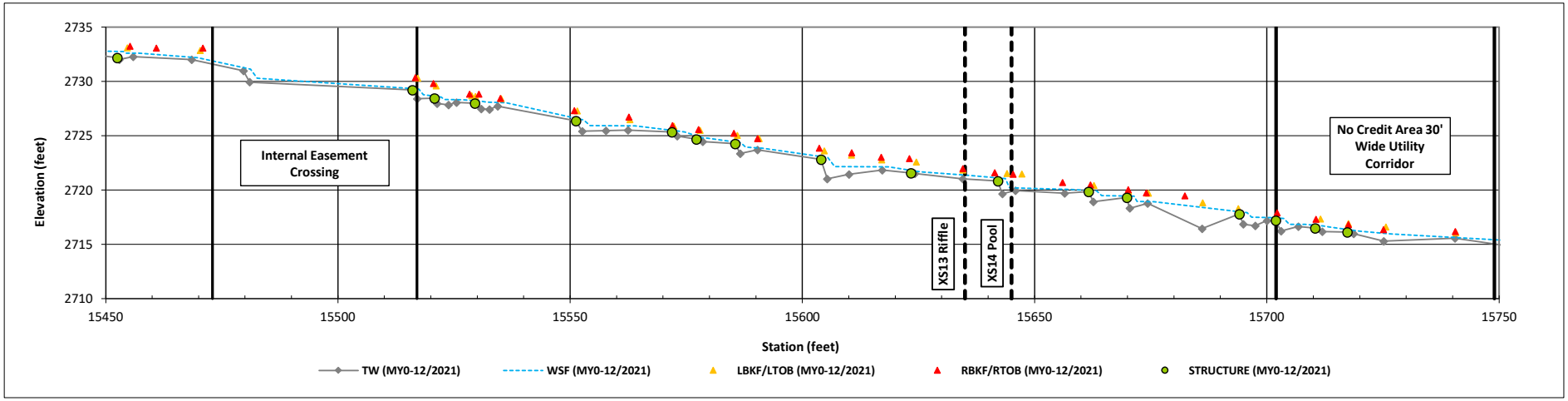
Longitudinal Profile Plots

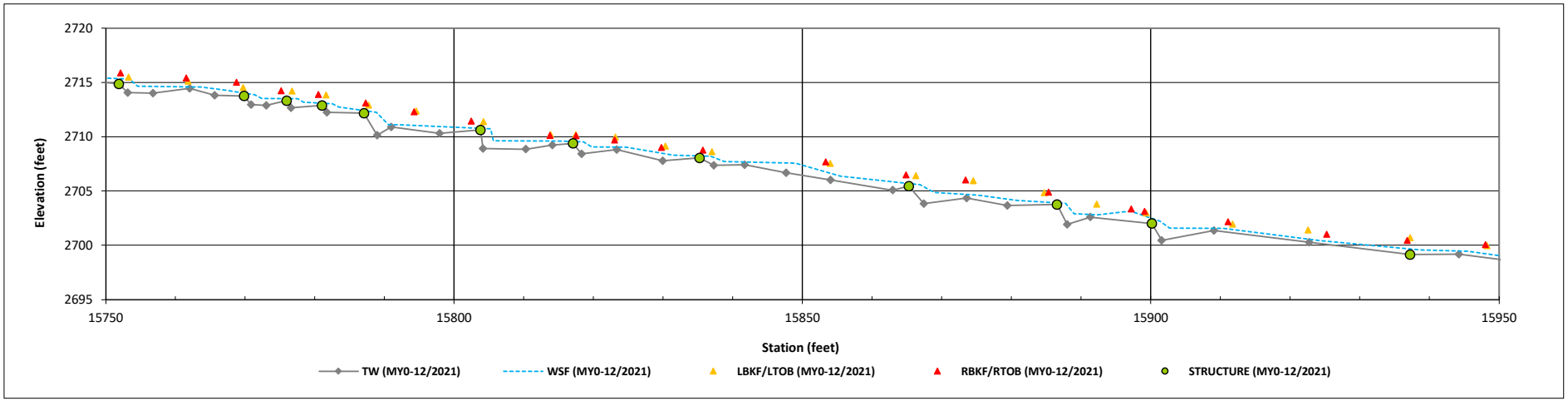
Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 0 - 2022

UT1A Reach 1 (STA 150+00 to 162+05)





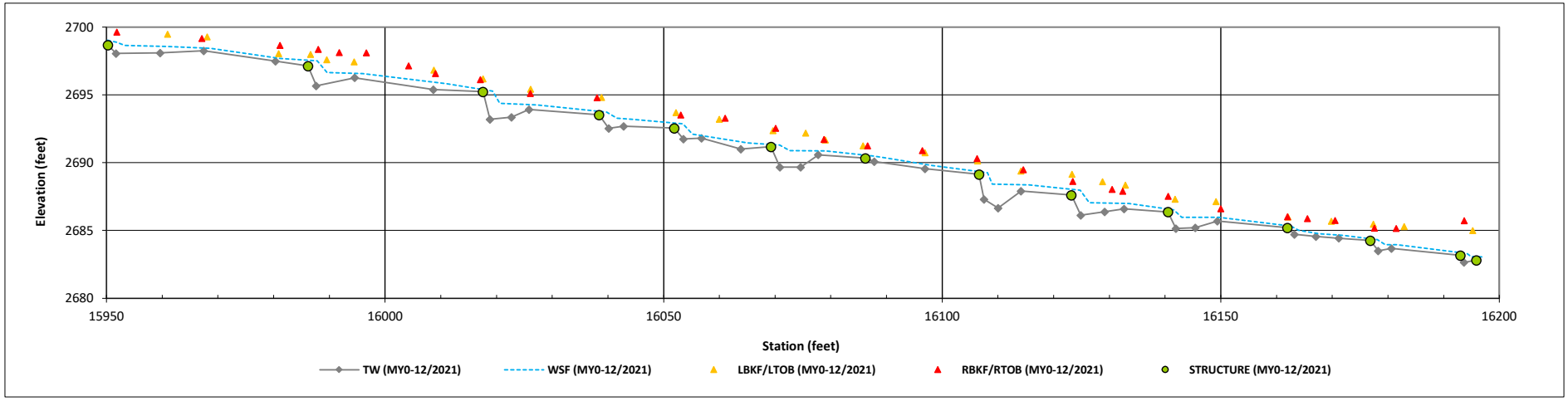
Longitudinal Profile Plots

Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 0 - 2022

UT1A Reach 1 (STA 150+00 to 162+05)



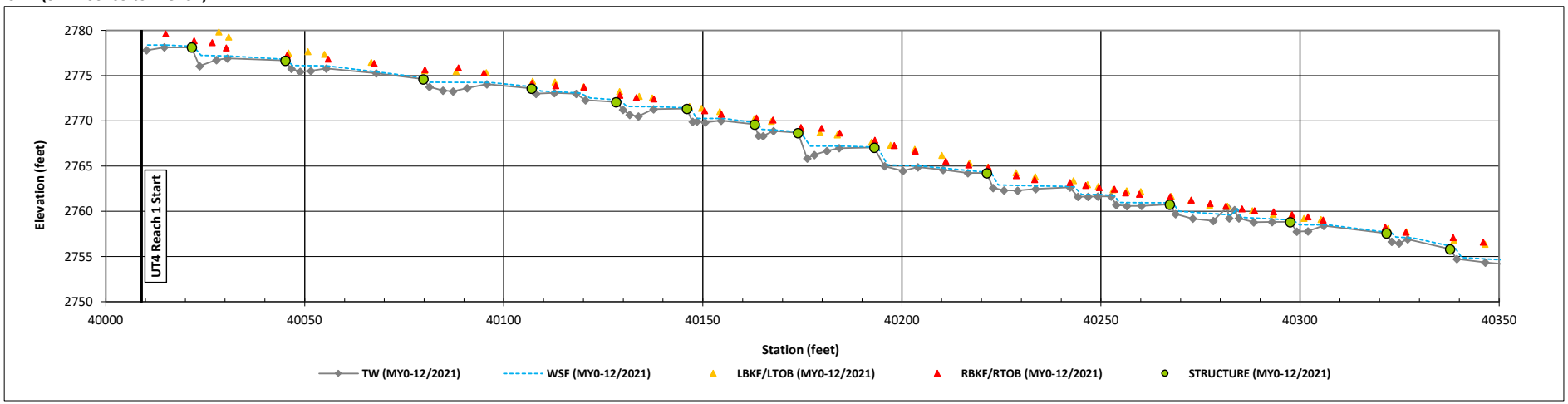
Longitudinal Profile Plots

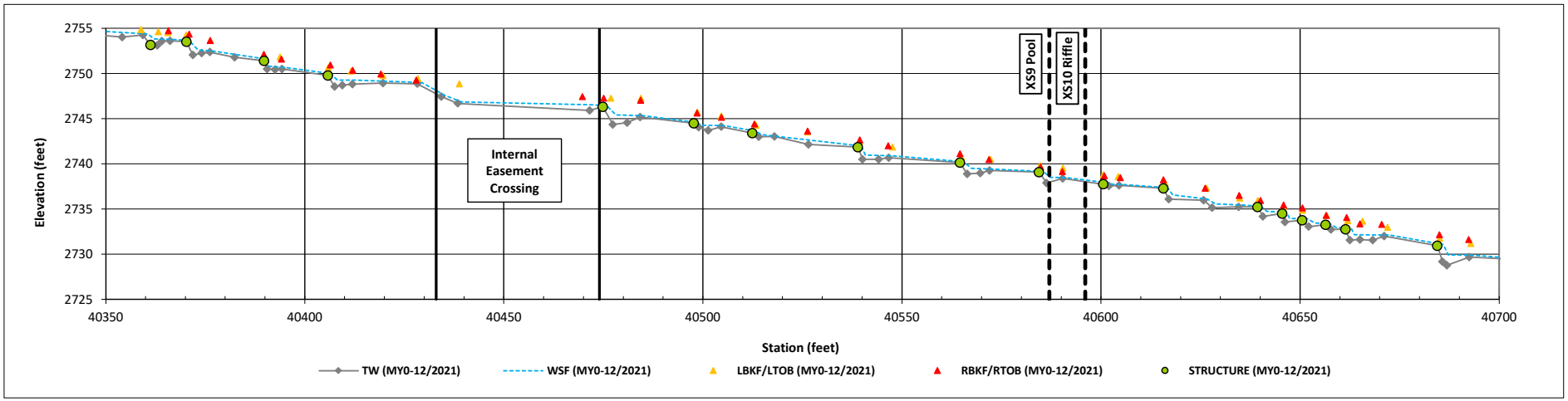
Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 0 - 2022

UT4 (STA 400+09 to 415+31)

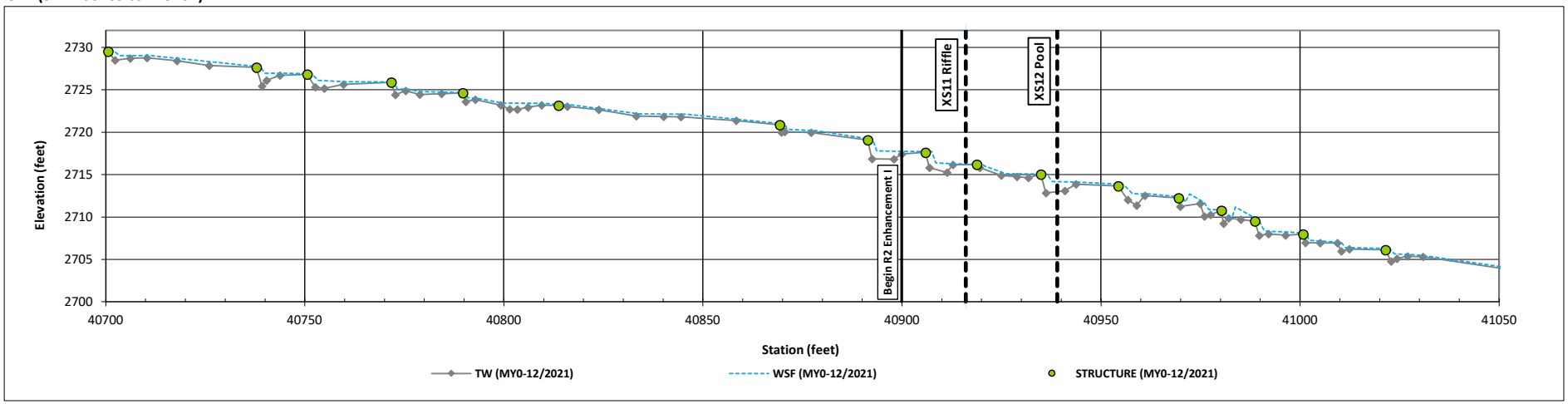


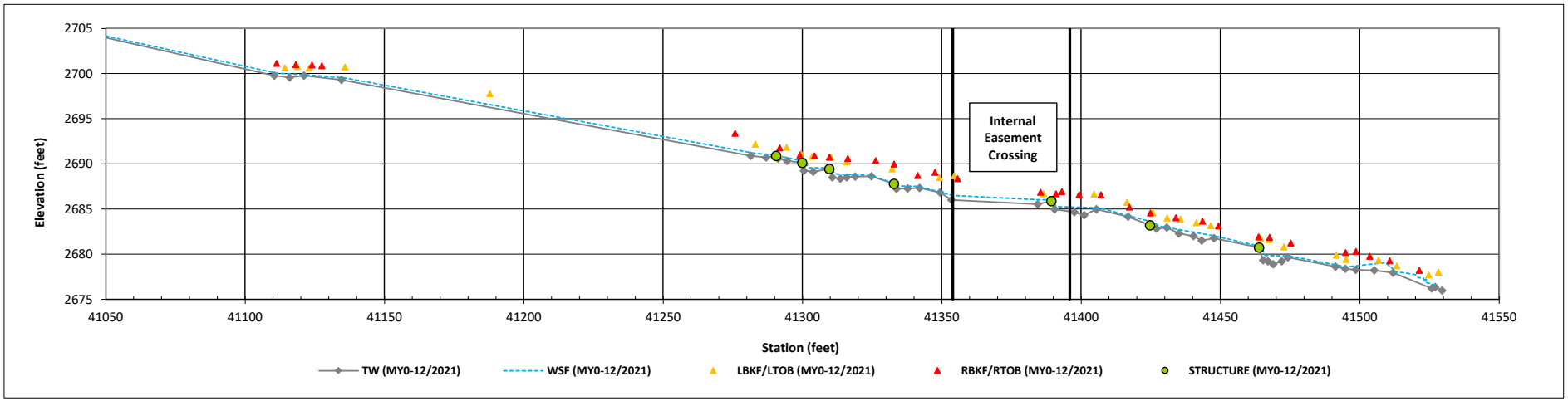


Longitudinal Profile Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT4 (STA 400+09 to 415+31)





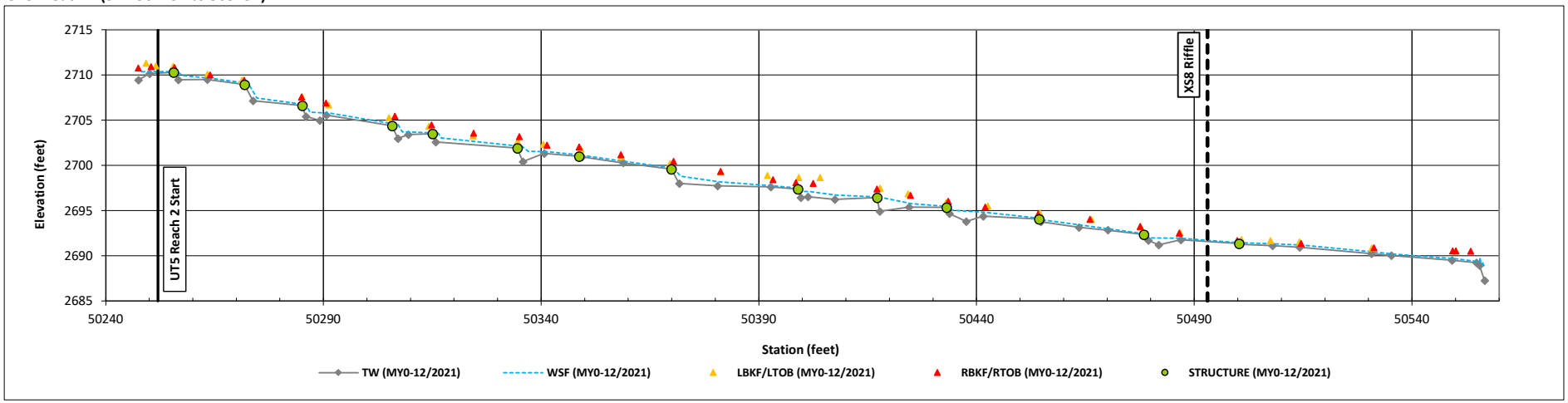
Longitudinal Profile Plots

Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 0 - 2022

UT5 Reach 2 (STA 502+52 to 505+57)



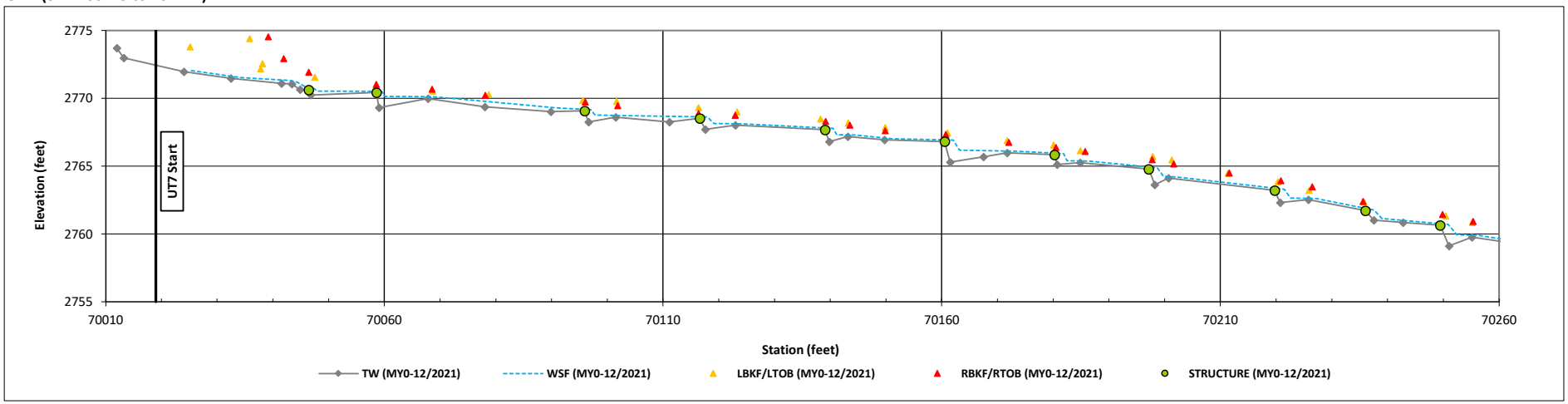
Longitudinal Profile Plots

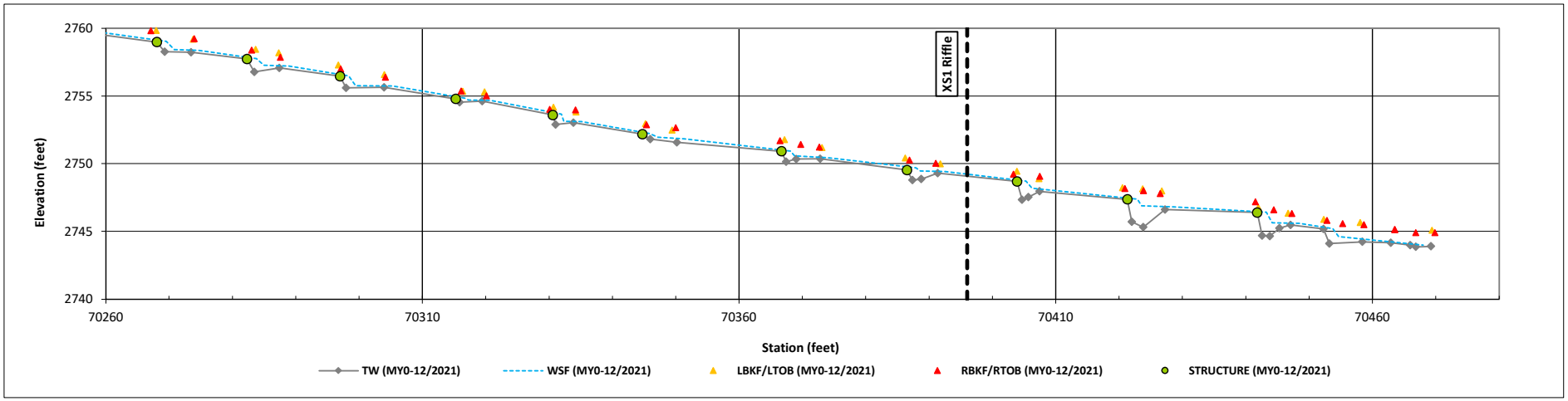
Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 0 - 2022

UT7 (STA 700+19 to 704+71)

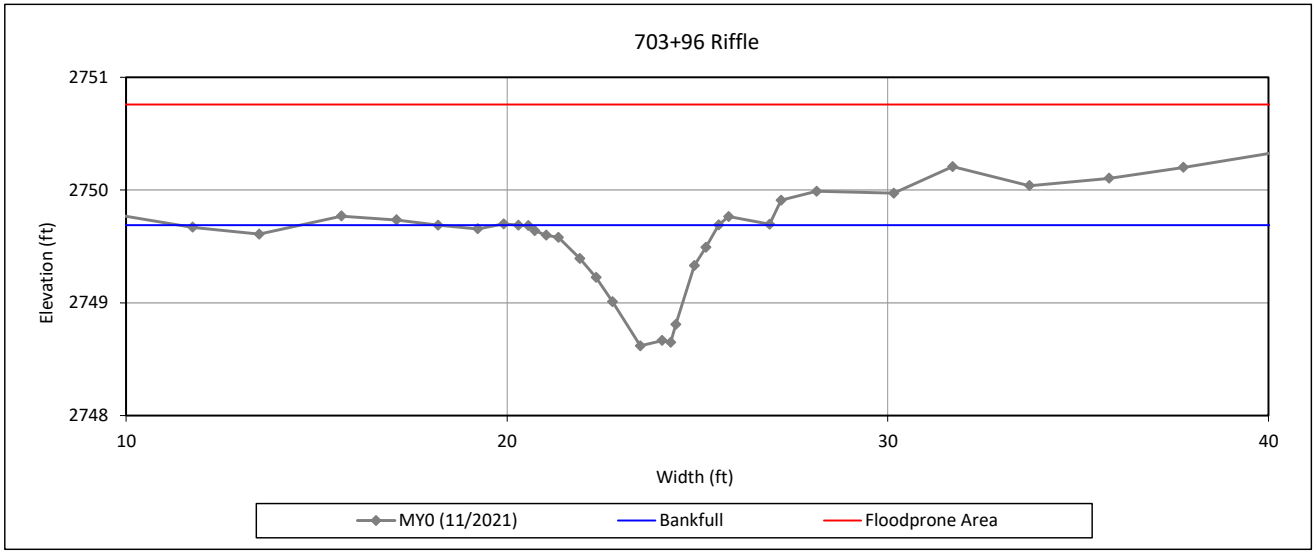




Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 1 - UT7



Bankfull Dimensions	
2.6	x-section area (ft.sq.)
5.3	width (ft)
0.5	mean depth (ft)
1.1	max depth (ft)
5.9	wetted perimeter (ft)
0.4	hydraulic radius (ft)
10.6	width-depth ratio
52.0	W flood prone area (ft)
9.9	entrenchment ratio
1.0	low bank height ratio

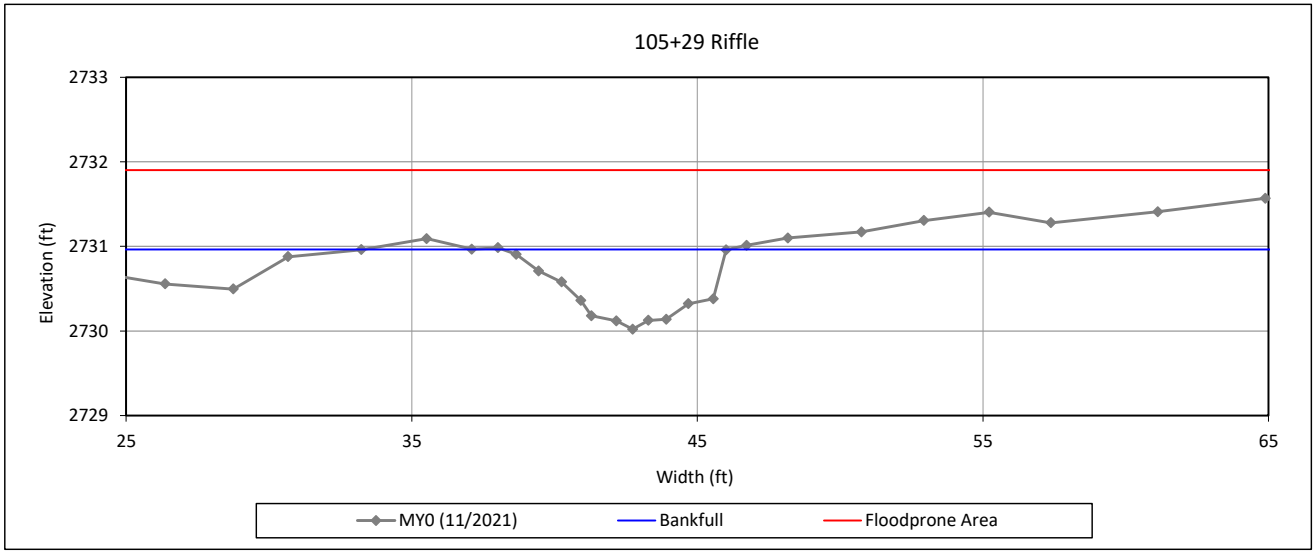
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 2 - UT to Crab Creek R1



Bankfull Dimensions	
4.4	x-section area (ft.sq.)
7.8	width (ft)
0.6	mean depth (ft)
0.9	max depth (ft)
8.2	wetted perimeter (ft)
0.5	hydraulic radius (ft)
13.7	width-depth ratio
65.8	W flood prone area (ft)
8.4	entrenchment ratio
1.0	low bank height ratio

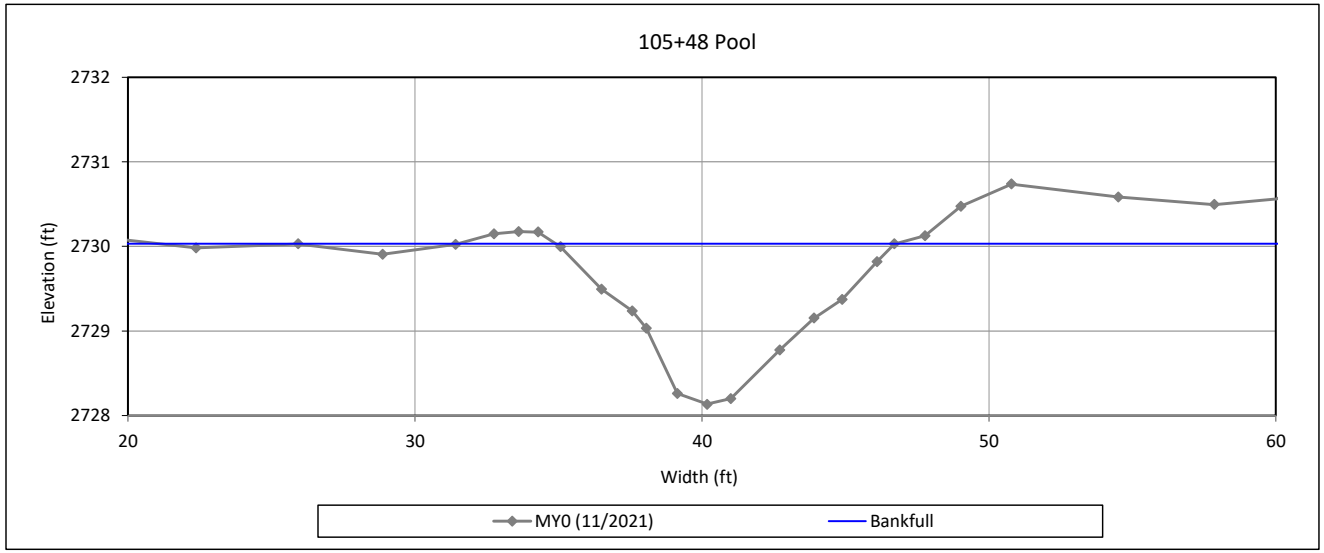
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 3 - UT to Crab Creek R1



Bankfull Dimensions	
11.7	x-section area (ft.sq.)
11.8	width (ft)
1.0	mean depth (ft)
1.9	max depth (ft)
12.5	wetted perimeter (ft)
0.9	hydraulic radius (ft)
11.8	width-depth ratio

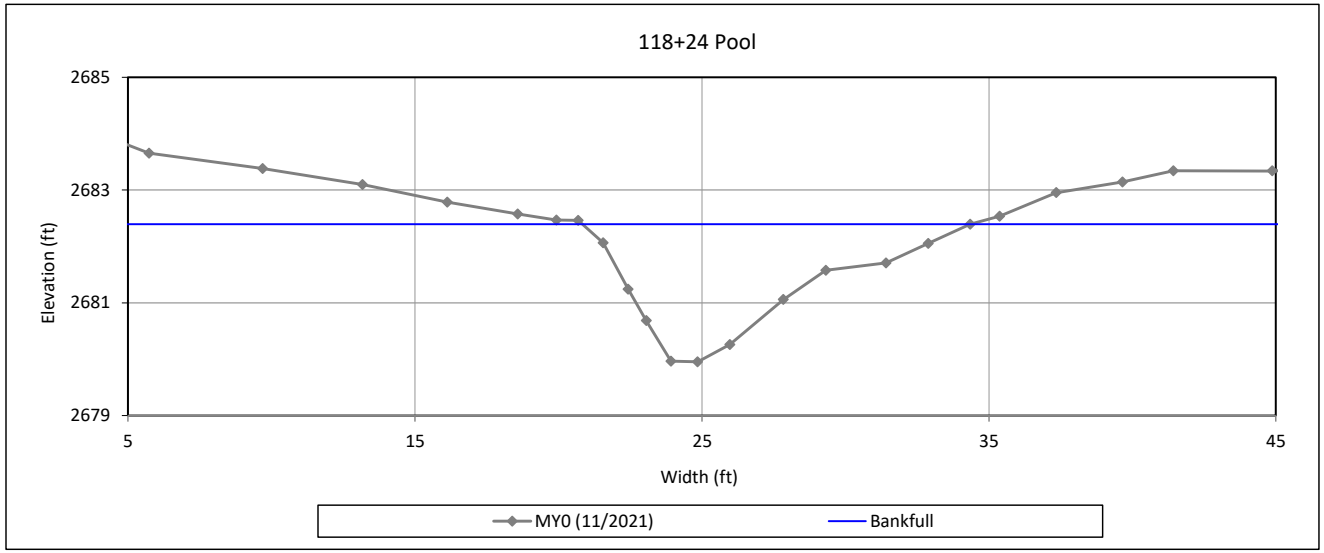
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 4 - UT to Crab Creek R1



Bankfull Dimensions	
15.7	x-section area (ft.sq.)
13.5	width (ft)
1.2	mean depth (ft)
2.4	max depth (ft)
14.8	wetted perimeter (ft)
1.1	hydraulic radius (ft)
11.6	width-depth ratio

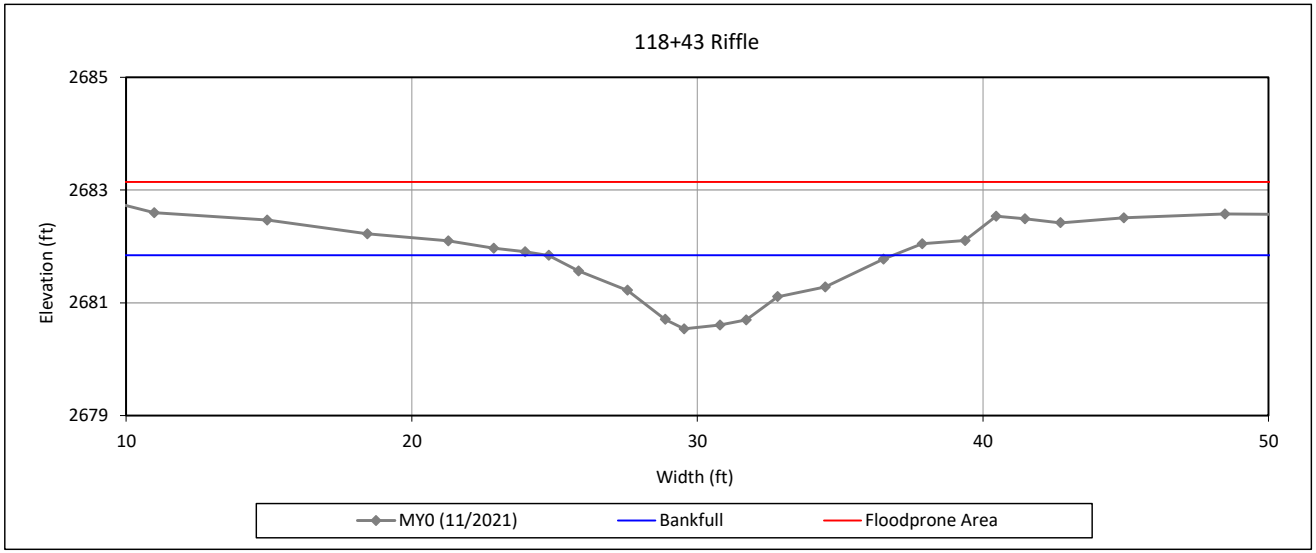
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 5 - UT to Crab Creek R1



Bankfull Dimensions	
8.3	x-section area (ft.sq.)
12.0	width (ft)
0.7	mean depth (ft)
1.3	max depth (ft)
12.4	wetted perimeter (ft)
0.7	hydraulic radius (ft)
17.4	width-depth ratio
50.4	W flood prone area (ft)
4.2	entrenchment ratio
1.0	low bank height ratio

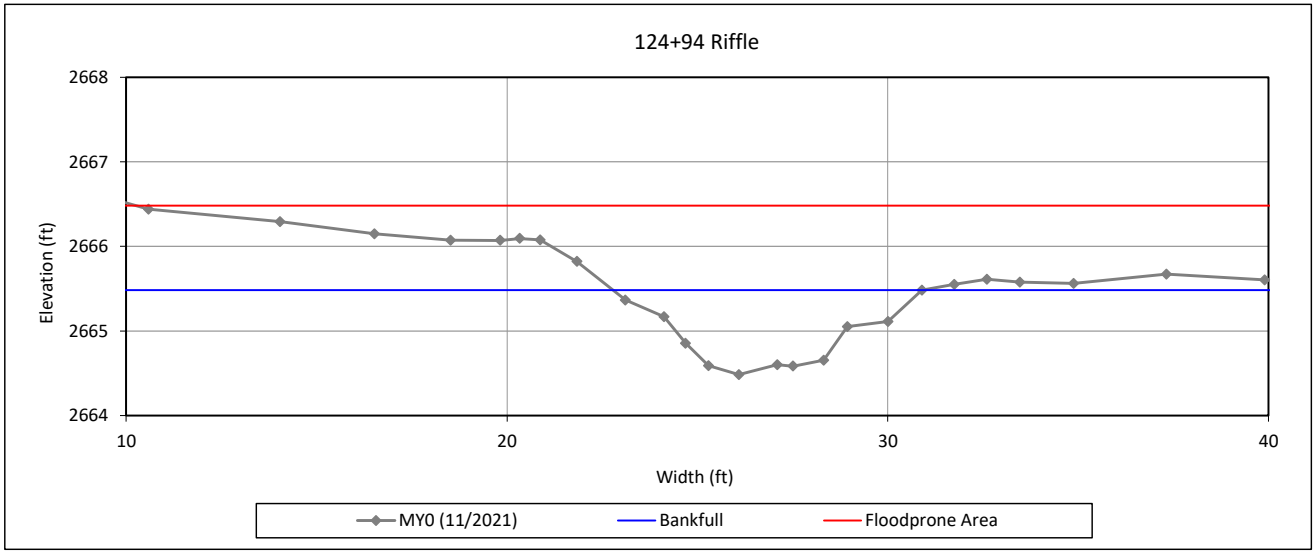
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 6 - UT to Crab Creek R2



Bankfull Dimensions	
4.7	x-section area (ft.sq.)
8.1	width (ft)
0.6	mean depth (ft)
1.0	max depth (ft)
8.5	wetted perimeter (ft)
0.6	hydraulic radius (ft)
14.0	width-depth ratio
41.6	W flood prone area (ft)
5.1	entrenchment ratio
1.0	low bank height ratio

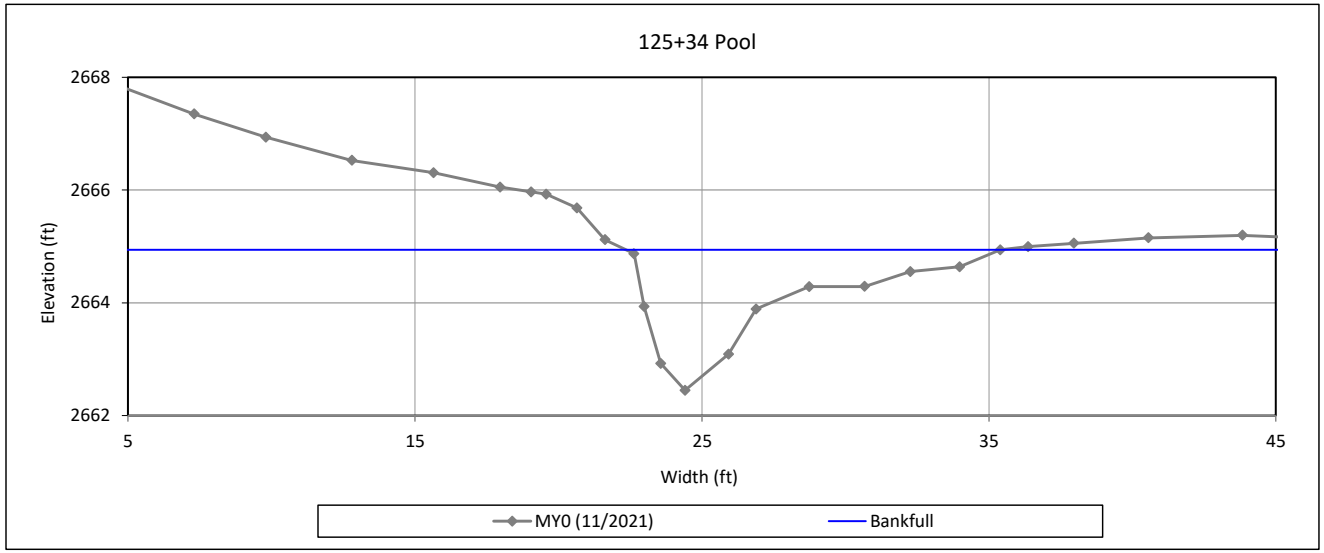
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 7 - UT to Crab Creek R2



Bankfull Dimensions	
12.1	x-section area (ft.sq.)
13.0	width (ft)
0.9	mean depth (ft)
2.5	max depth (ft)
14.9	wetted perimeter (ft)
0.8	hydraulic radius (ft)
14.0	width-depth ratio

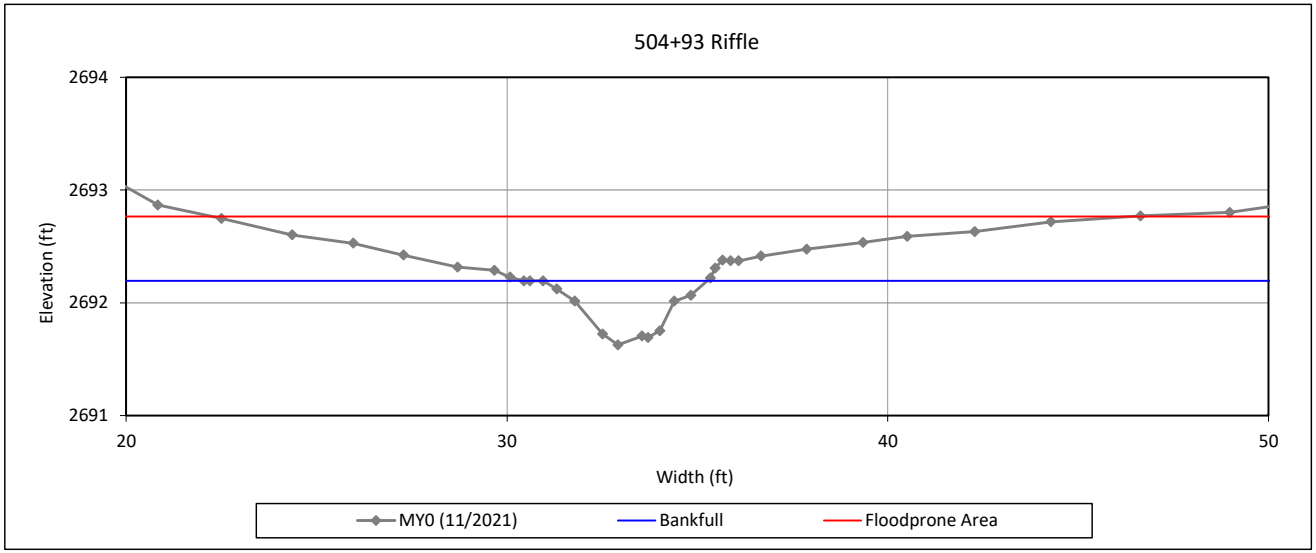
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 8 - UT5 R2



Bankfull Dimensions	
1.3	x-section area (ft.sq.)
4.3	width (ft)
0.3	mean depth (ft)
0.6	max depth (ft)
4.5	wetted perimeter (ft)
0.3	hydraulic radius (ft)
14.4	width-depth ratio
24.1	W flood prone area (ft)
5.6	entrenchment ratio
1.0	low bank height ratio

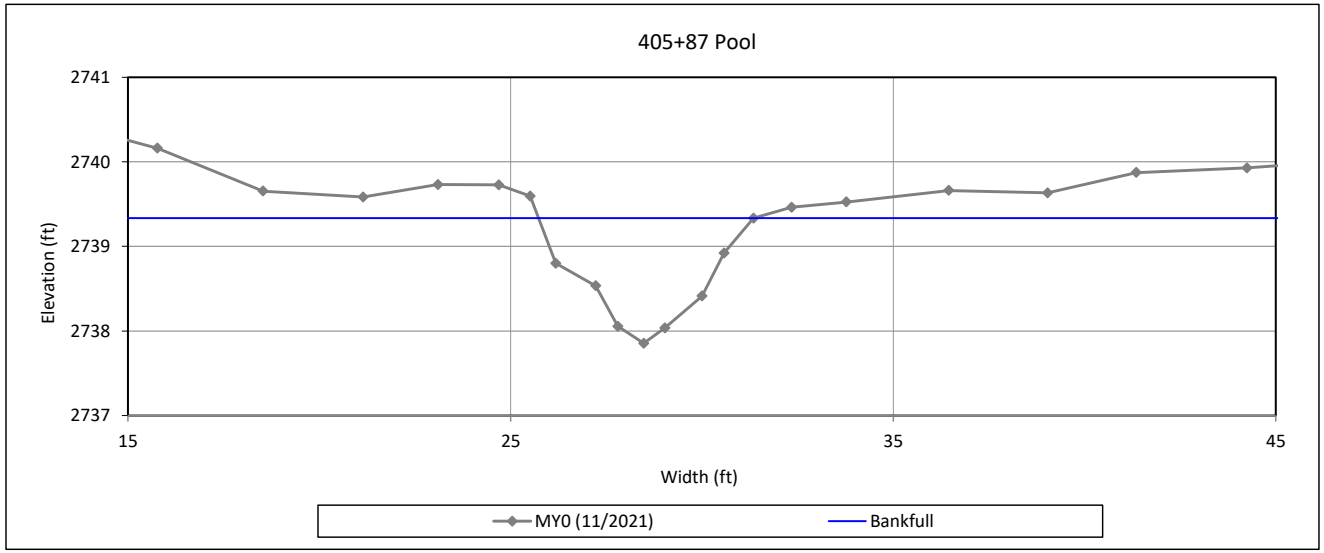
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 9 - UT4 R1



Bankfull Dimensions	
4.7	x-section area (ft.sq.)
5.6	width (ft)
0.8	mean depth (ft)
1.5	max depth (ft)
6.5	wetted perimeter (ft)
0.7	hydraulic radius (ft)
6.7	width-depth ratio

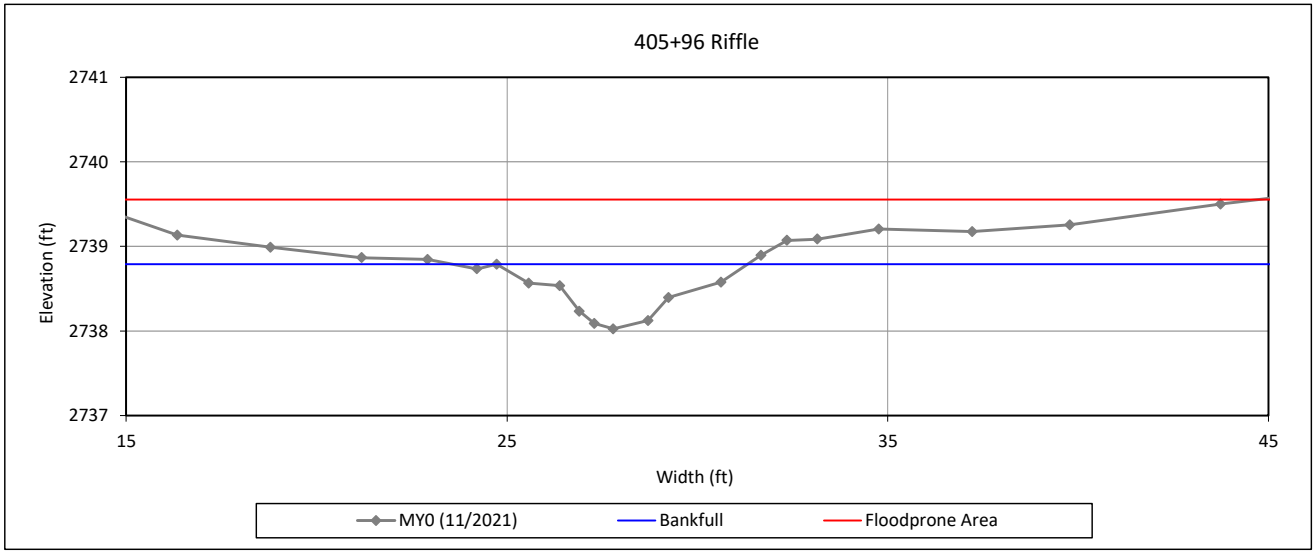
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 10 - UT4 R1



Bankfull Dimensions	
2.5	x-section area (ft.sq.)
6.6	width (ft)
0.4	mean depth (ft)
0.8	max depth (ft)
6.8	wetted perimeter (ft)
0.4	hydraulic radius (ft)
17.1	width-depth ratio
31.1	W flood prone area (ft)
4.7	entrenchment ratio
1.0	low bank height ratio

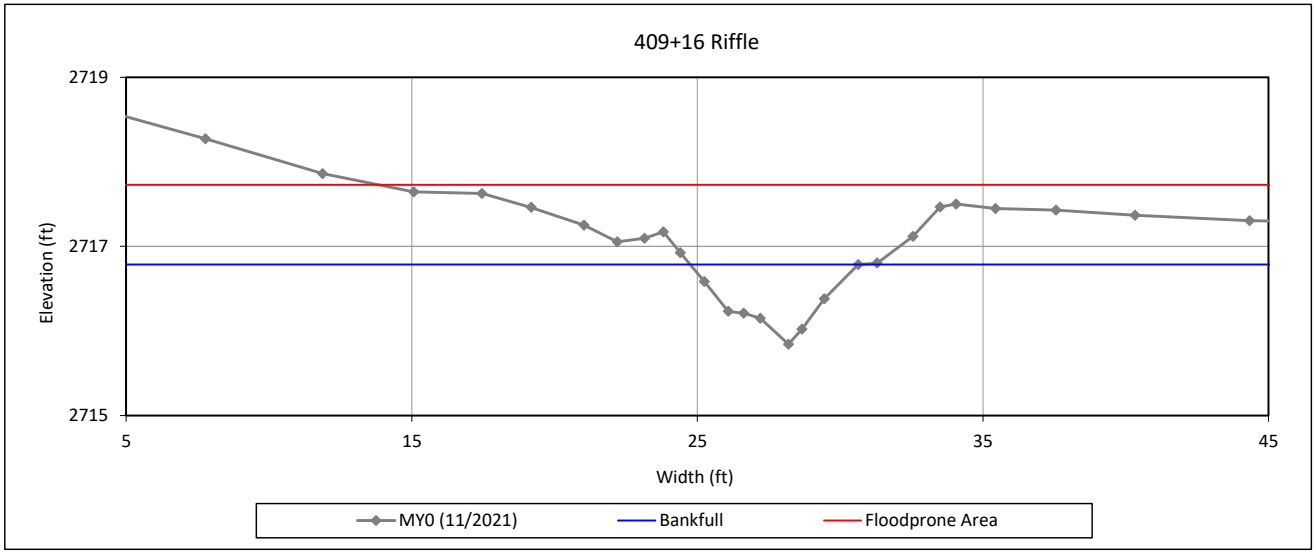
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 11 - UT4 R2



Bankfull Dimensions	
2.9	x-section area (ft.sq.)
5.9	width (ft)
0.5	mean depth (ft)
0.9	max depth (ft)
6.2	wetted perimeter (ft)
0.5	hydraulic radius (ft)
11.9	width-depth ratio
33.9	W flood prone area (ft)
5.8	entrenchment ratio
1.0	low bank height ratio

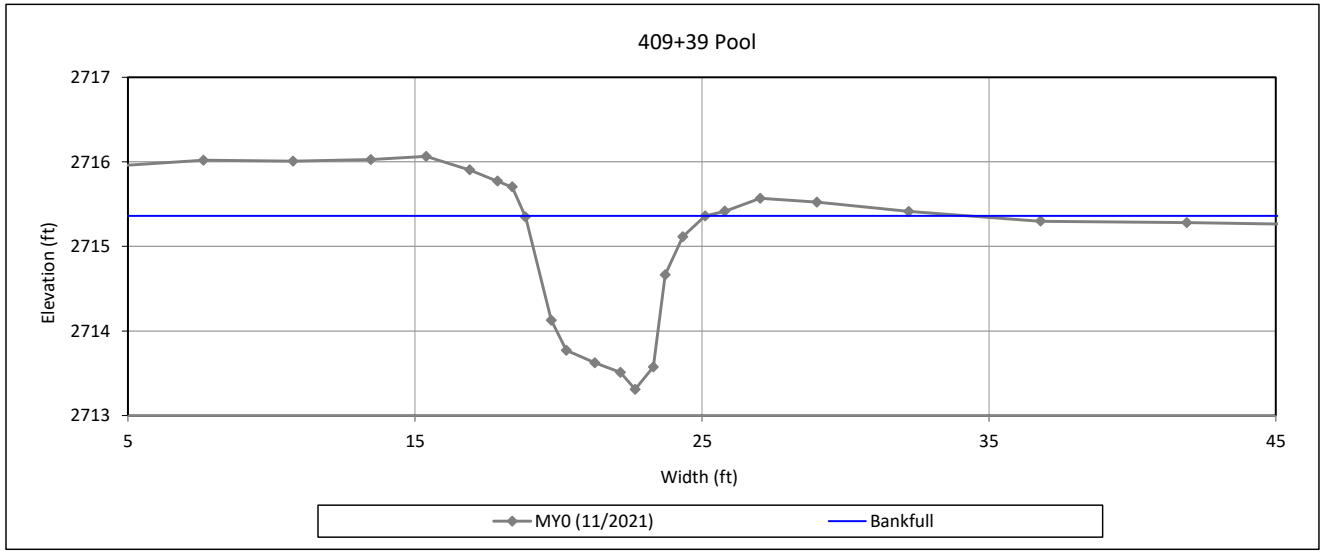
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 12 - UT4 R2



Bankfull Dimensions	
7.7	x-section area (ft.sq.)
6.3	width (ft)
1.2	mean depth (ft)
2.1	max depth (ft)
8.1	wetted perimeter (ft)
1.0	hydraulic radius (ft)
5.1	width-depth ratio

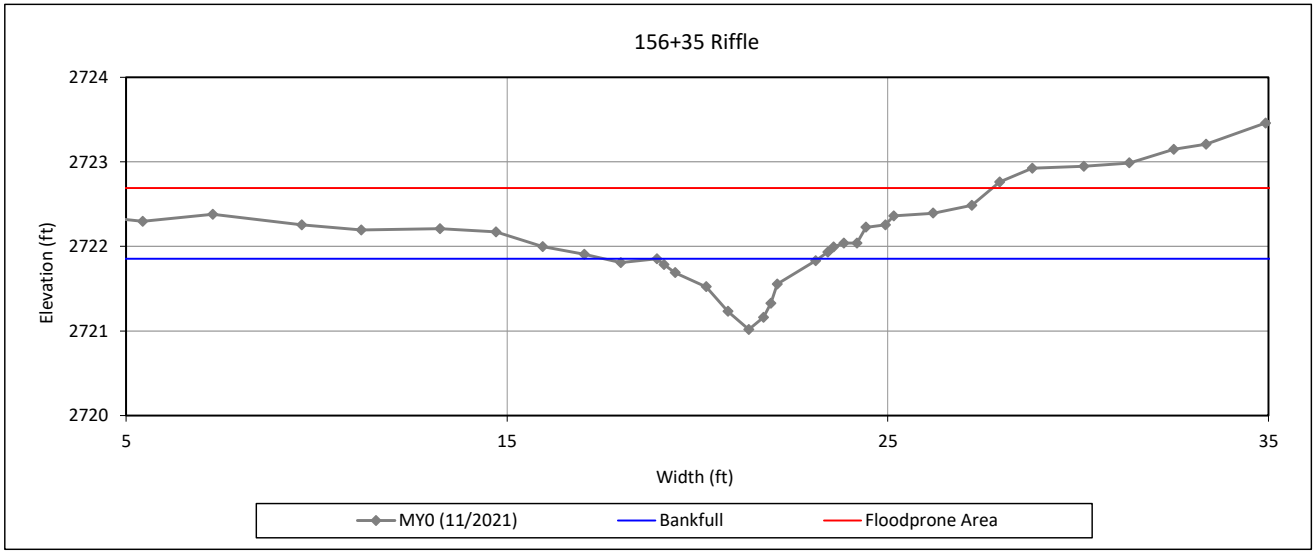
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 13 - UT1A R1



Bankfull Dimensions	
1.6	x-section area (ft.sq.)
4.2	width (ft)
0.4	mean depth (ft)
0.8	max depth (ft)
4.6	wetted perimeter (ft)
0.3	hydraulic radius (ft)
11.5	width-depth ratio
27.5	W flood prone area (ft)
6.5	entrenchment ratio
1.0	low bank height ratio

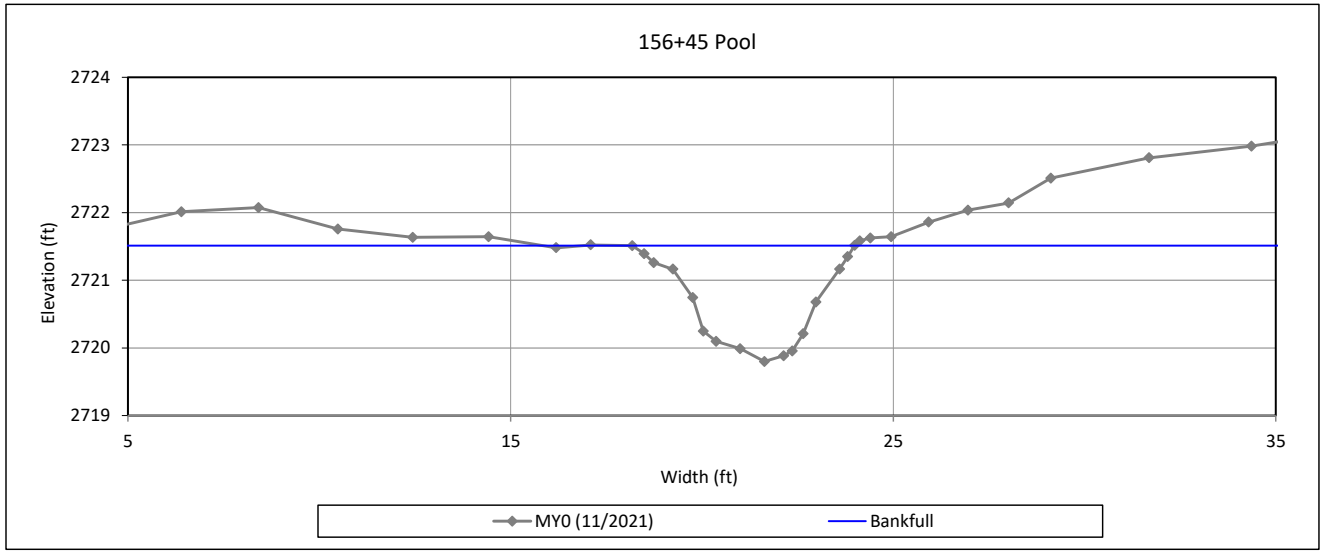
Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Cross-Section 14 - UT1A R1



Bankfull Dimensions	
5.6	x-section area (ft.sq.)
5.8	width (ft)
1.0	mean depth (ft)
1.7	max depth (ft)
7.0	wetted perimeter (ft)
0.8	hydraulic radius (ft)
6.0	width-depth ratio

Survey Date: 11/2021
Field Crew: Kee Mapping & Surveying

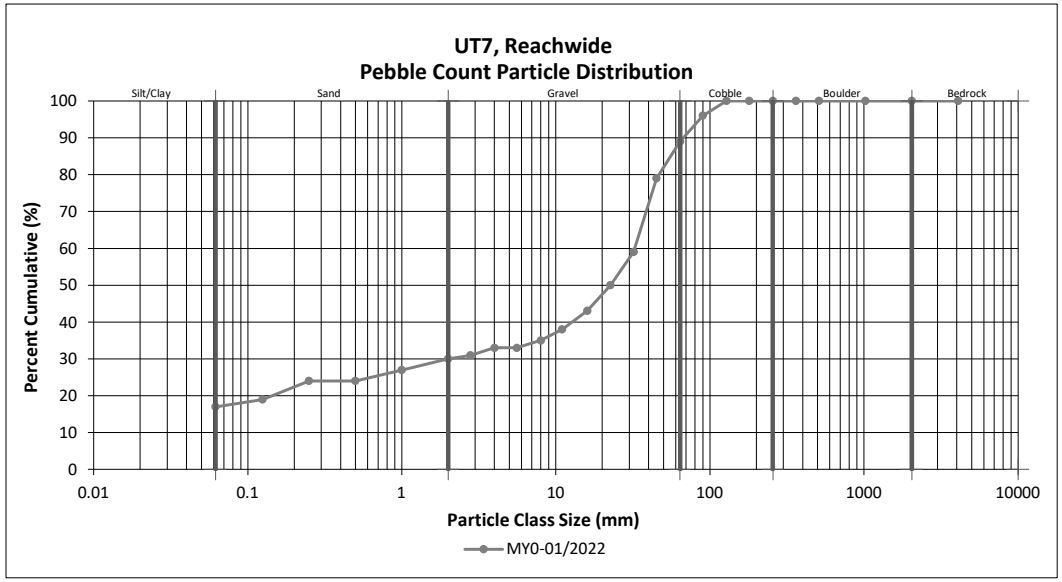
View Downstream

Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT7, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		17	17	17	17
SAND	Very fine	0.062	0.125		2	2	2	19
	Fine	0.125	0.250	1	4	5	5	24
	Medium	0.25	0.50					24
	Coarse	0.5	1.0	2	1	3	3	27
	Very Coarse	1.0	2.0	2	1	3	3	30
GRAVEL	Very Fine	2.0	2.8		1	1	1	31
	Very Fine	2.8	4.0	1	1	2	2	33
	Fine	4.0	5.6					33
	Fine	5.6	8.0	1	1	2	2	35
	Medium	8.0	11.0	2	1	3	3	38
	Medium	11.0	16.0	3	2	5	5	43
	Coarse	16.0	22.6	6	1	7	7	50
	Coarse	22.6	32	6	3	9	9	59
	Very Coarse	32	45	14	6	20	20	79
	Very Coarse	45	64	5	5	10	10	89
COBBLE	Small	64	90	6	1	7	7	96
	Small	90	128	1	3	4	4	100
	Large	128	180					100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**



Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	8.0
D_{50} =	22.6
D_{84} =	53.7
D_{95} =	85.7
D_{100} =	128.0

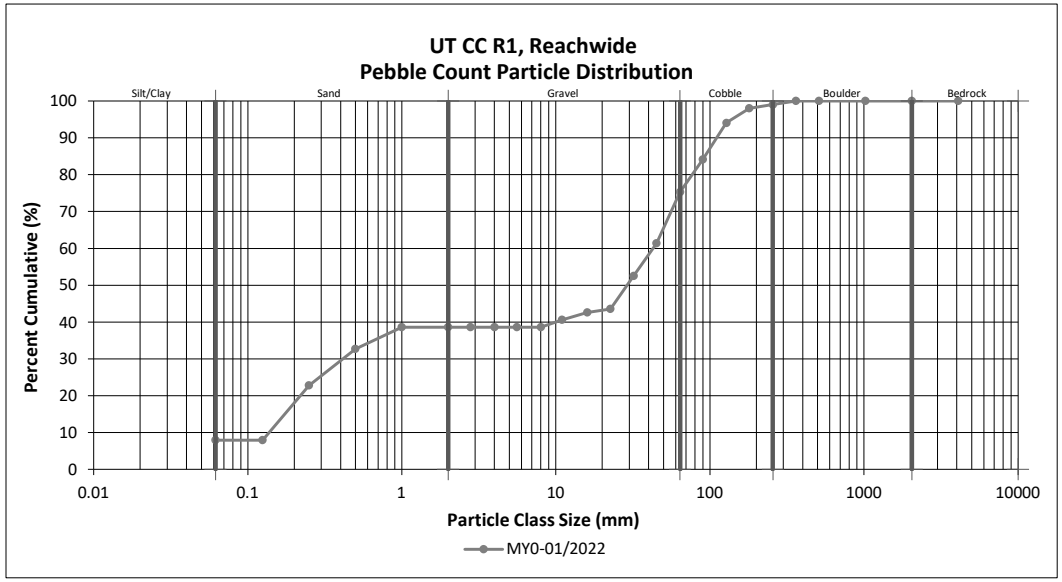
Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT CC R1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		8	8	8	8
SAND	Very fine	0.062	0.125					8
	Fine	0.125	0.250		15	15	15	23
	Medium	0.25	0.50		10	10	10	33
	Coarse	0.5	1.0	1	5	6	6	39
	Very Coarse	1.0	2.0					39
GRAVEL	Very Fine	2.0	2.8					39
	Very Fine	2.8	4.0					39
	Fine	4.0	5.6					39
	Fine	5.6	8.0					39
	Medium	8.0	11.0		2	2	2	41
	Medium	11.0	16.0		2	2	2	43
	Coarse	16.0	22.6	1		1	1	44
	Coarse	22.6	32	9		9	9	52
	Very Coarse	32	45	9		9	9	61
	Very Coarse	45	64	11	3	14	14	75
COBBLE	Small	64	90	5	4	9	9	84
	Small	90	128	9	1	10	10	94
	Large	128	180	4		4	4	98
	Large	180	256	1		1	1	99
BOULDER	Small	256	362	1		1	1	100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**51**	**50**	**101**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	0.2
D_{35} =	0.7
D_{50} =	29.1
D_{84} =	89.5
D_{95} =	138.8
D_{100} =	362.0



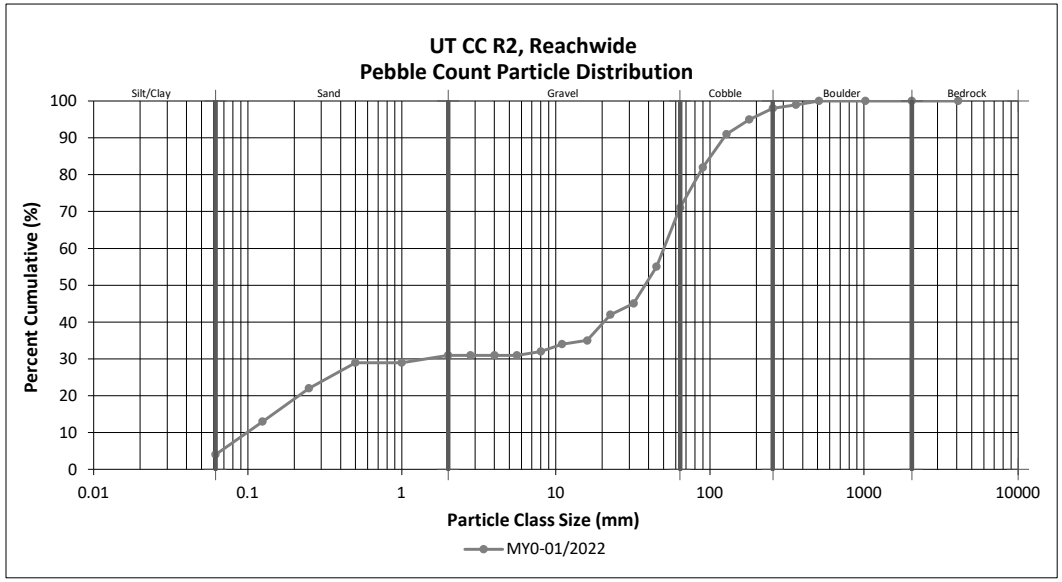
Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT CC R2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		4	4	4	4
SAND	Very fine	0.062	0.125		9	9	9	13
	Fine	0.125	0.250		9	9	9	22
	Medium	0.25	0.50	1	6	7	7	29
	Coarse	0.5	1.0					29
	Very Coarse	1.0	2.0		2	2	2	31
GRAVEL	Very Fine	2.0	2.8					31
	Very Fine	2.8	4.0					31
	Fine	4.0	5.6					31
	Fine	5.6	8.0	1		1	1	32
	Medium	8.0	11.0		2	2	2	34
	Medium	11.0	16.0		1	1	1	35
	Coarse	16.0	22.6	3	4	7	7	42
	Coarse	22.6	32	2	1	3	3	45
	Very Coarse	32	45	8	2	10	10	55
	Very Coarse	45	64	12	4	16	16	71
COBBLE	Small	64	90	8	3	11	11	82
	Small	90	128	6	3	9	9	91
	Large	128	180	4		4	4	95
	Large	180	256	3		3	3	98
BOULDER	Small	256	362	1		1	1	99
	Small	362	512	1		1	1	100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	0.2
D_{35} =	16.0
D_{50} =	37.9
D_{84} =	97.3
D_{95} =	180.0
D_{100} =	512.0

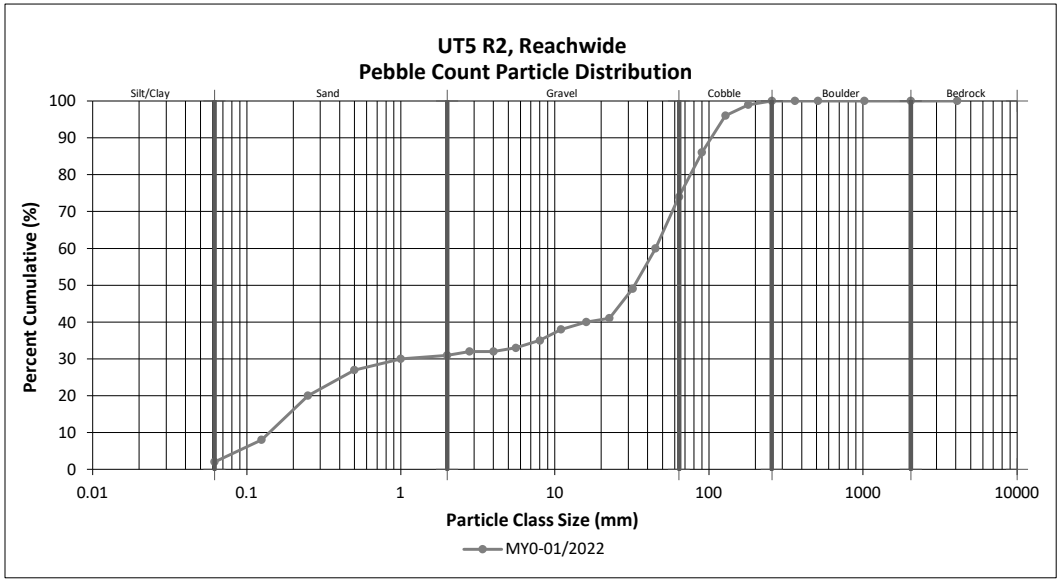


Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT5 R2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		2	2	2	2
SAND	Very fine	0.062	0.125	2	4	6	6	8
	Fine	0.125	0.250	1	11	12	12	20
	Medium	0.25	0.50	1	6	7	7	27
	Coarse	0.5	1.0		3	3	3	30
	Very Coarse	1.0	2.0		1	1	1	31
GRAVEL	Very Fine	2.0	2.8		1	1	1	32
	Very Fine	2.8	4.0					32
	Fine	4.0	5.6		1	1	1	33
	Fine	5.6	8.0		2	2	2	35
	Medium	8.0	11.0		3	3	3	38
	Medium	11.0	16.0	2		2	2	40
	Coarse	16.0	22.6	1		1	1	41
	Coarse	22.6	32	4	4	8	8	49
	Very Coarse	32	45	10	1	11	11	60
	Very Coarse	45	64	11	3	14	14	74
COBBLE	Small	64	90	8	4	12	12	86
	Small	90	128	6	4	10	10	96
	Large	128	180	3		3	3	99
	Large	180	256	1		1	1	100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**



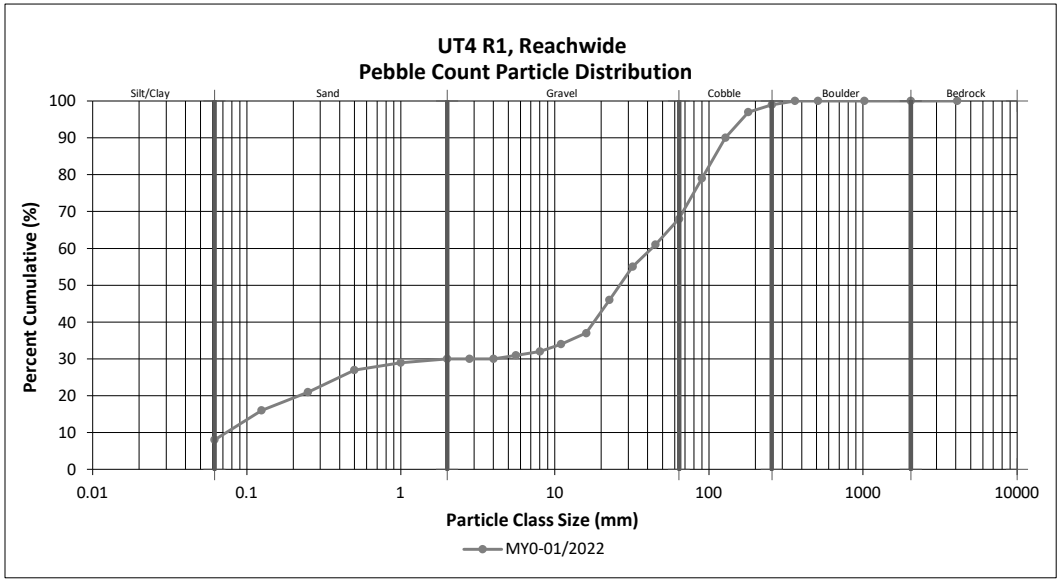
Reachwide	
Channel materials (mm)	
D_{16} =	0.2
D_{35} =	8.0
D_{50} =	33.0
D_{84} =	85.0
D_{95} =	123.6
D_{100} =	256.0

Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT4 R1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		8	8	8	8
SAND	Very fine	0.062	0.125	2	6	8	8	16
	Fine	0.125	0.250	1	4	5	5	21
	Medium	0.25	0.50		6	6	6	27
	Coarse	0.5	1.0		2	2	2	29
	Very Coarse	1.0	2.0		1	1	1	30
GRAVEL	Very Fine	2.0	2.8					30
	Very Fine	2.8	4.0					30
	Fine	4.0	5.6		1	1	1	31
	Fine	5.6	8.0		1	1	1	32
	Medium	8.0	11.0		2	2	2	34
	Medium	11.0	16.0	2	1	3	3	37
	Coarse	16.0	22.6	2	7	9	9	46
	Coarse	22.6	32	5	4	9	9	55
	Very Coarse	32	45	6		6	6	61
	Very Coarse	45	64	6	1	7	7	68
COBBLE	Small	64	90	9	2	11	11	79
	Small	90	128	11		11	11	90
	Large	128	180	3	4	7	7	97
	Large	180	256	2		2	2	99
BOULDER	Small	256	362	1		1	1	100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**



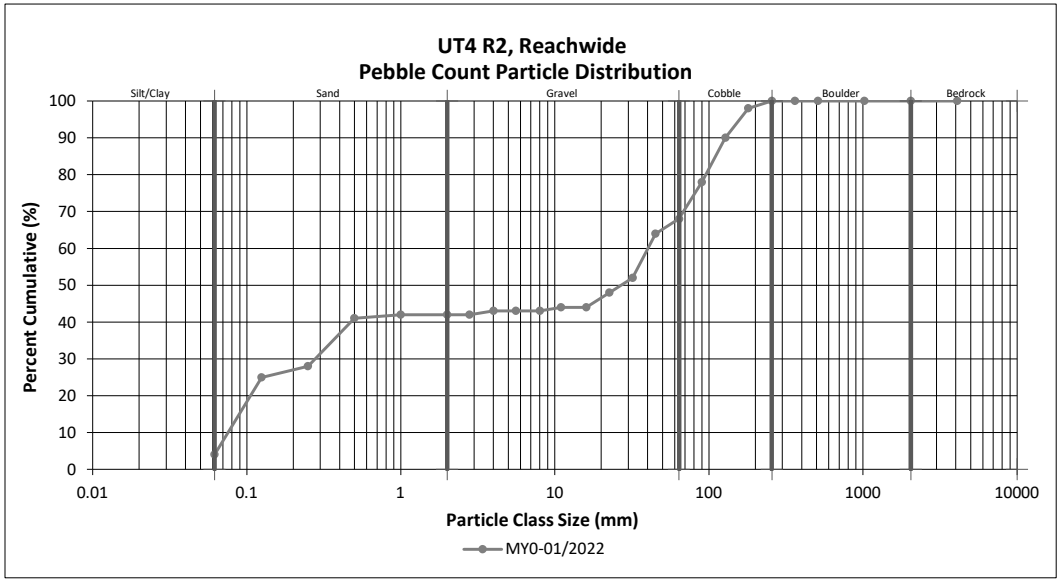
Reachwide	
Channel materials (mm)	
D_{16} =	0.1
D_{35} =	12.5
D_{50} =	26.4
D_{84} =	105.6
D_{95} =	163.3
D_{100} =	362.0

Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT4 R2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		4	4	4	4
SAND	Very fine	0.062	0.125		21	21	21	25
	Fine	0.125	0.250		3	3	3	28
	Medium	0.25	0.50	1	12	13	13	41
	Coarse	0.5	1.0		1	1	1	42
	Very Coarse	1.0	2.0					42
GRAVEL	Very Fine	2.0	2.8					42
	Very Fine	2.8	4.0		1	1	1	43
	Fine	4.0	5.6					43
	Fine	5.6	8.0					43
	Medium	8.0	11.0		1	1	1	44
	Medium	11.0	16.0					44
	Coarse	16.0	22.6	4		4	4	48
	Coarse	22.6	32	2	2	4	4	52
	Very Coarse	32	45	12		12	12	64
	Very Coarse	45	64	4		4	4	68
COBBLE	Small	64	90	8	2	10	10	78
	Small	90	128	10	2	12	12	90
	Large	128	180	8		8	8	98
	Large	180	256	1	1	2	2	100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**



Reachwide	
Channel materials (mm)	
D_{16} =	0.1
D_{35} =	0.4
D_{50} =	26.9
D_{84} =	107.3
D_{95} =	158.4
D_{100} =	256.0

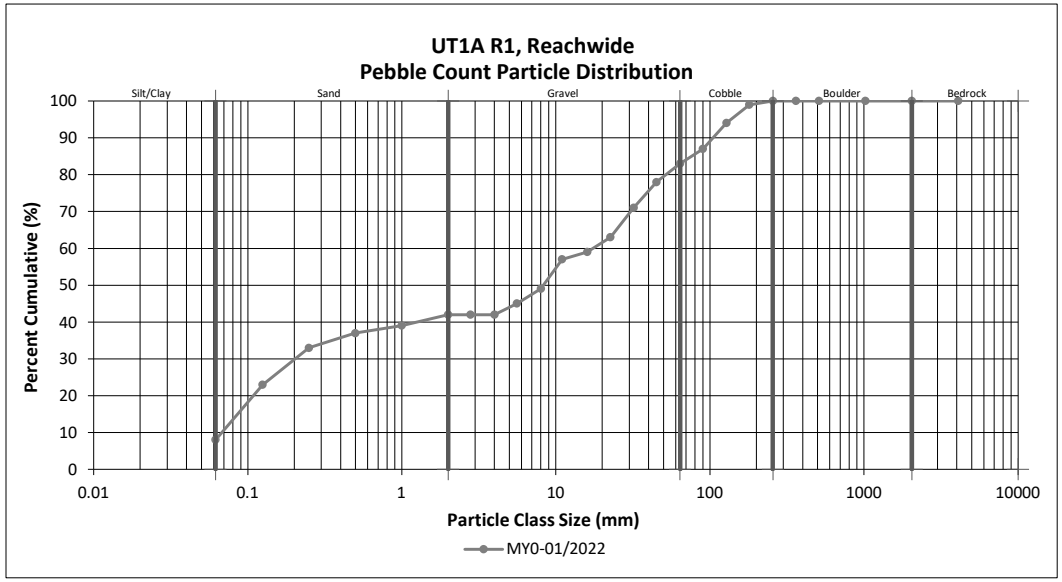
Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT1A R1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	7	8	8	8
SAND	Very fine	0.062	0.125	2	13	15	15	23
	Fine	0.125	0.250	4	6	10	10	33
	Medium	0.25	0.50	2	2	4	4	37
	Coarse	0.5	1.0		2	2	2	39
	Very Coarse	1.0	2.0	1	2	3	3	42
GRAVEL	Very Fine	2.0	2.8					42
	Very Fine	2.8	4.0					42
	Fine	4.0	5.6	2	1	3	3	45
	Fine	5.6	8.0	2	2	4	4	49
	Medium	8.0	11.0	3	5	8	8	57
	Medium	11.0	16.0	2		2	2	59
	Coarse	16.0	22.6	2	2	4	4	63
	Coarse	22.6	32	7	1	8	8	71
	Very Coarse	32	45	4	3	7	7	78
	Very Coarse	45	64	3	2	5	5	83
COBBLE	Small	64	90	3	1	4	4	87
	Small	90	128	7		7	7	94
	Large	128	180	4	1	5	5	99
	Large	180	256	1		1	1	100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	0.1
D_{35} =	0.4
D_{50} =	8.3
D_{84} =	69.7
D_{95} =	137.0
D_{100} =	256.0



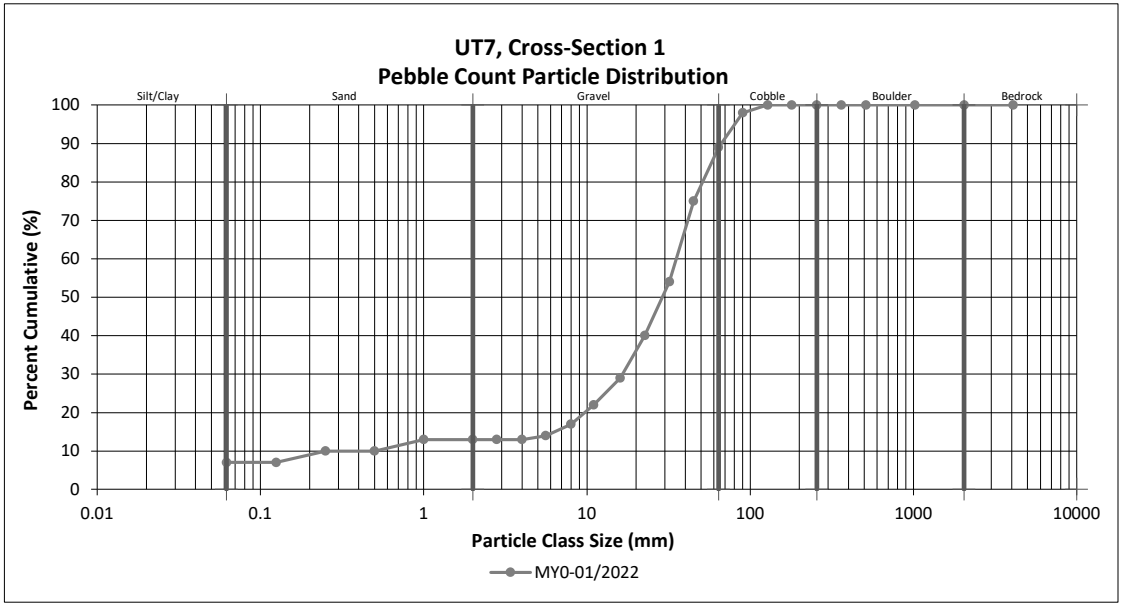
Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT7, Cross-Section 1

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	7	7	7
SAND	Very fine	0.062	0.125			7
	Fine	0.125	0.250	3	3	10
	Medium	0.25	0.50			10
	Coarse	0.5	1.0	3	3	13
	Very Coarse	1.0	2.0			13
GRAVEL	Very Fine	2.0	2.8			13
	Very Fine	2.8	4.0			13
	Fine	4.0	5.6	1	1	14
	Fine	5.6	8.0	3	3	17
	Medium	8.0	11.0	5	5	22
	Medium	11.0	16.0	7	7	29
	Coarse	16.0	22.6	11	11	40
	Coarse	22.6	32	14	14	54
	Very Coarse	32	45	21	21	75
	Very Coarse	45	64	14	14	89
COBBLE	Small	64	90	9	9	98
	Small	90	128	2	2	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 1	
Channel materials (mm)	
D_{16} =	7.1
D_{35} =	19.3
D_{50} =	29.0
D_{84} =	56.4
D_{95} =	80.3
D_{100} =	128.0

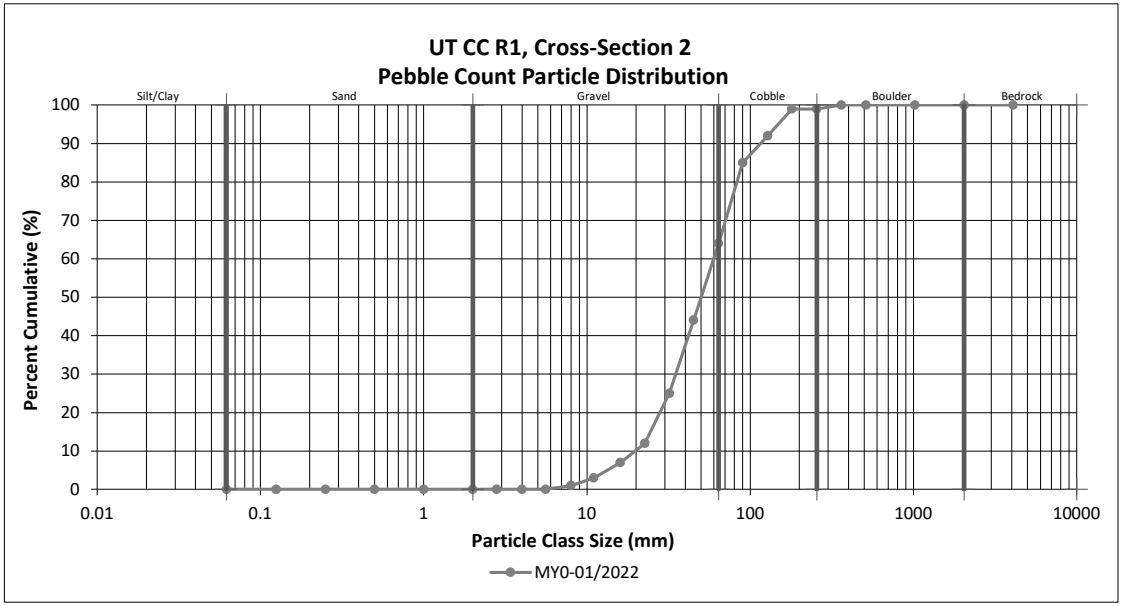


Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT CC R1, Cross-Section 2

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0			0
GRAVEL	Very Fine	2.0	2.8			0
	Very Fine	2.8	4.0			0
	Fine	4.0	5.6			0
	Fine	5.6	8.0	1	1	1
	Medium	8.0	11.0	2	2	3
	Medium	11.0	16.0	4	4	7
	Coarse	16.0	22.6	5	5	12
	Coarse	22.6	32	13	13	25
	Very Coarse	32	45	19	19	44
	Very Coarse	45	64	20	20	64
COBBLE	Small	64	90	21	21	85
	Small	90	128	7	7	92
	Large	128	180	7	7	99
	Large	180	256			99
BOULDER	Small	256	362	1	1	100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



Cross-Section 2	
Channel materials (mm)	
D_{16} =	25.2
D_{35} =	38.3
D_{50} =	50.0
D_{84} =	88.6
D_{95} =	148.1
D_{100} =	362.0

Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
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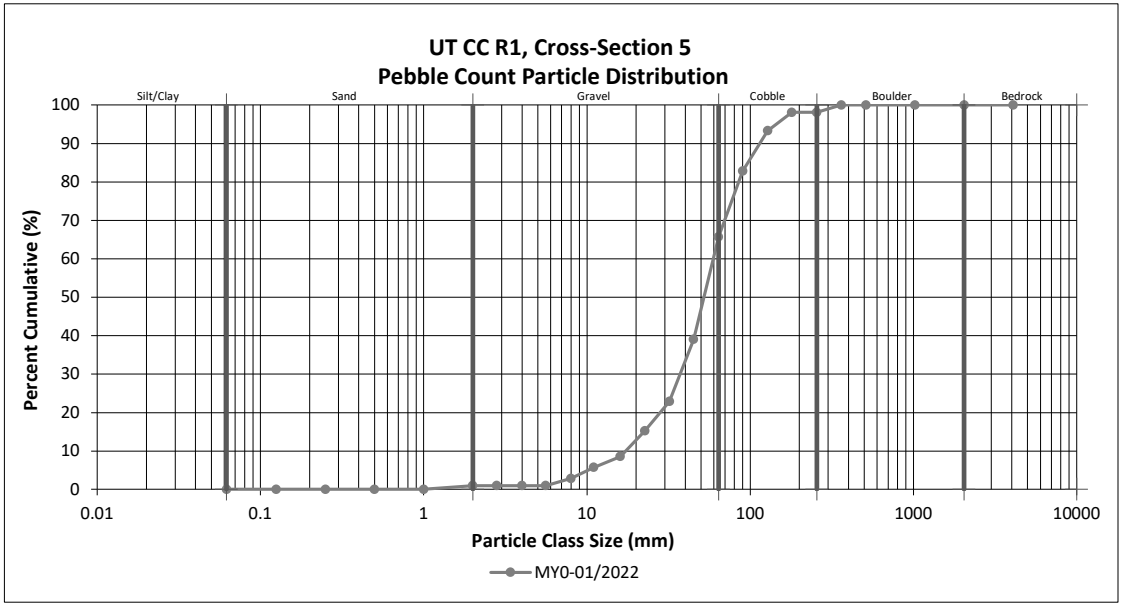
UT CC R1, Cross-Section 5

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0	1	1	1
GRAVEL	Very Fine	2.0	2.8			1
	Very Fine	2.8	4.0			1
	Fine	4.0	5.6			1
	Fine	5.6	8.0	2	2	3
	Medium	8.0	11.0	3	3	6
	Medium	11.0	16.0	3	3	9
	Coarse	16.0	22.6	7	7	15
	Coarse	22.6	32	8	8	23
	Very Coarse	32	45	17	16	39
	Very Coarse	45	64	28	27	66
COBBLE	Small	64	90	18	17	83
	Small	90	128	11	10	93
	Large	128	180	5	5	98
	Large	180	256			98
BOULDER	Small	256	362	2	2	100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**105**	**100**	**100**



Cross-Section 5	
Channel materials (mm)	
D_{16} =	23.4
D_{35} =	41.3
D_{50} =	52.0
D_{84} =	93.5
D_{95} =	144.2
D_{100} =	362.0

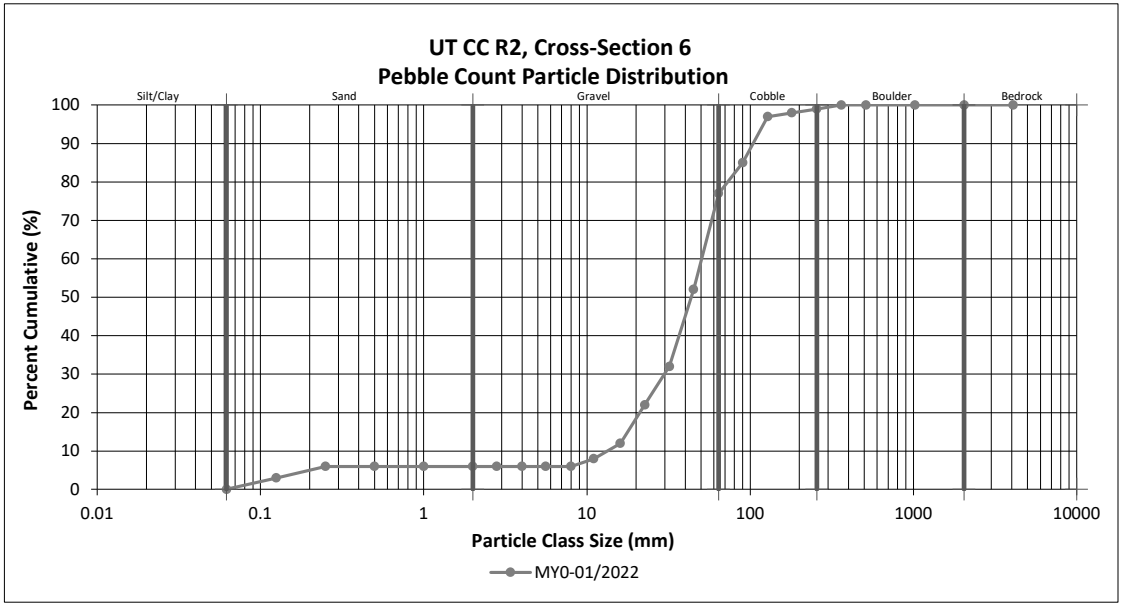
Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT CC R2, Cross-Section 6

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125	3	3	3
	Fine	0.125	0.250	3	3	6
	Medium	0.25	0.50			6
	Coarse	0.5	1.0			6
	Very Coarse	1.0	2.0			6
GRAVEL	Very Fine	2.0	2.8			6
	Very Fine	2.8	4.0			6
	Fine	4.0	5.6			6
	Fine	5.6	8.0			6
	Medium	8.0	11.0	2	2	8
	Medium	11.0	16.0	4	4	12
	Coarse	16.0	22.6	10	10	22
	Coarse	22.6	32	10	10	32
	Very Coarse	32	45	20	20	52
	Very Coarse	45	64	25	25	77
COBBLE	Small	64	90	8	8	85
	Small	90	128	12	12	97
	Large	128	180	1	1	98
	Large	180	256	1	1	99
BOULDER	Small	256	362	1	1	100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 6	
Channel materials (mm)	
D_{16} =	18.4
D_{35} =	33.7
D_{50} =	43.5
D_{84} =	86.2
D_{95} =	120.7
D_{100} =	362.0



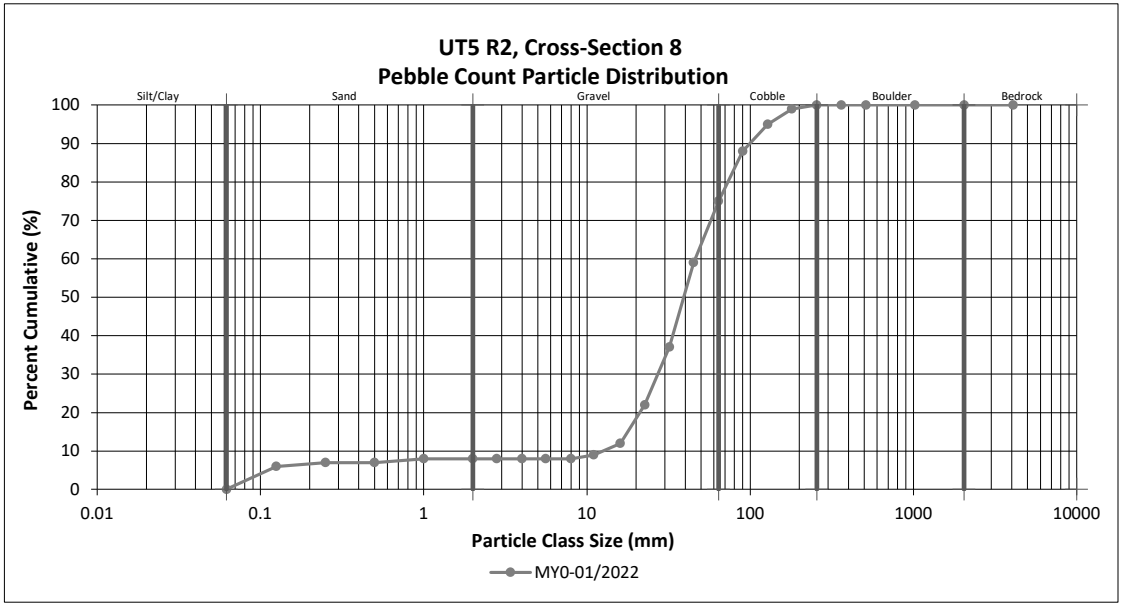
Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT5 R2, Cross-Section 8

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125	6	6	6
	Fine	0.125	0.250	1	1	7
	Medium	0.25	0.50			7
	Coarse	0.5	1.0	1	1	8
	Very Coarse	1.0	2.0			8
GRAVEL	Very Fine	2.0	2.8			8
	Very Fine	2.8	4.0			8
	Fine	4.0	5.6			8
	Fine	5.6	8.0			8
	Medium	8.0	11.0	1	1	9
	Medium	11.0	16.0	3	3	12
	Coarse	16.0	22.6	10	10	22
	Coarse	22.6	32	15	15	37
	Very Coarse	32	45	22	22	59
	Very Coarse	45	64	16	16	75
COBBLE	Small	64	90	13	13	88
	Small	90	128	7	7	95
	Large	128	180	4	4	99
	Large	180	256	1	1	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 8	
Channel materials (mm)	
D_{16} =	18.4
D_{35} =	30.5
D_{50} =	39.1
D_{84} =	81.0
D_{95} =	128.0
D_{100} =	256.0

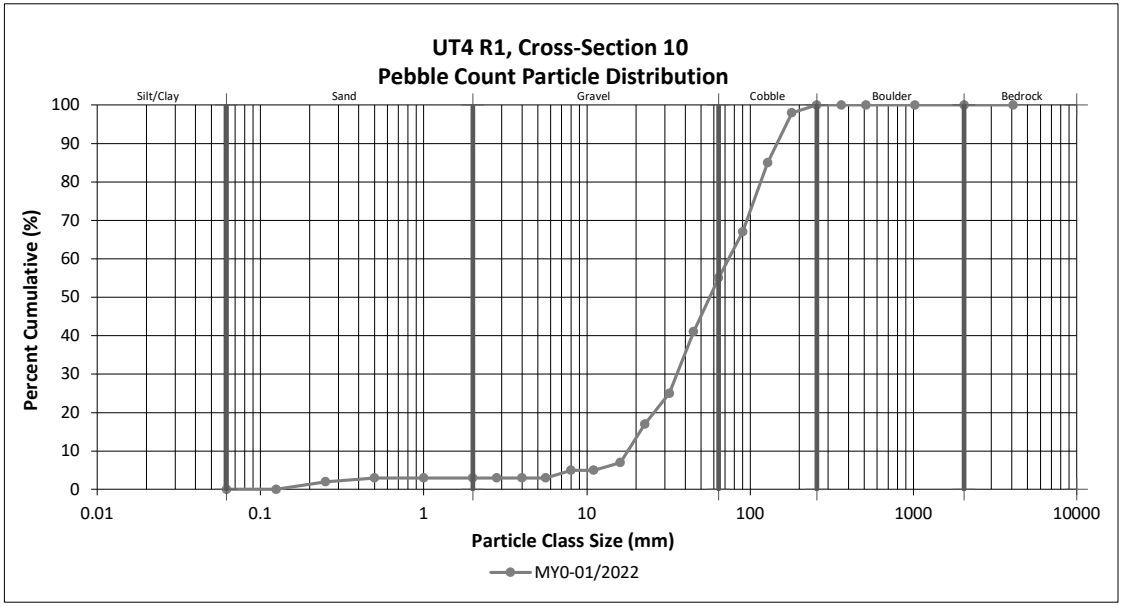


Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT4 R1, Cross-Section 10

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250	2	2	2
	Medium	0.25	0.50	1	1	3
	Coarse	0.5	1.0			3
	Very Coarse	1.0	2.0			3
GRAVEL	Very Fine	2.0	2.8			3
	Very Fine	2.8	4.0			3
	Fine	4.0	5.6			3
	Fine	5.6	8.0	2	2	5
	Medium	8.0	11.0			5
	Medium	11.0	16.0	2	2	7
	Coarse	16.0	22.6	10	10	17
	Coarse	22.6	32	8	8	25
	Very Coarse	32	45	16	16	41
	Very Coarse	45	64	14	14	55
COBBLE	Small	64	90	12	12	67
	Small	90	128	18	18	85
	Large	128	180	13	13	98
	Large	180	256	2	2	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



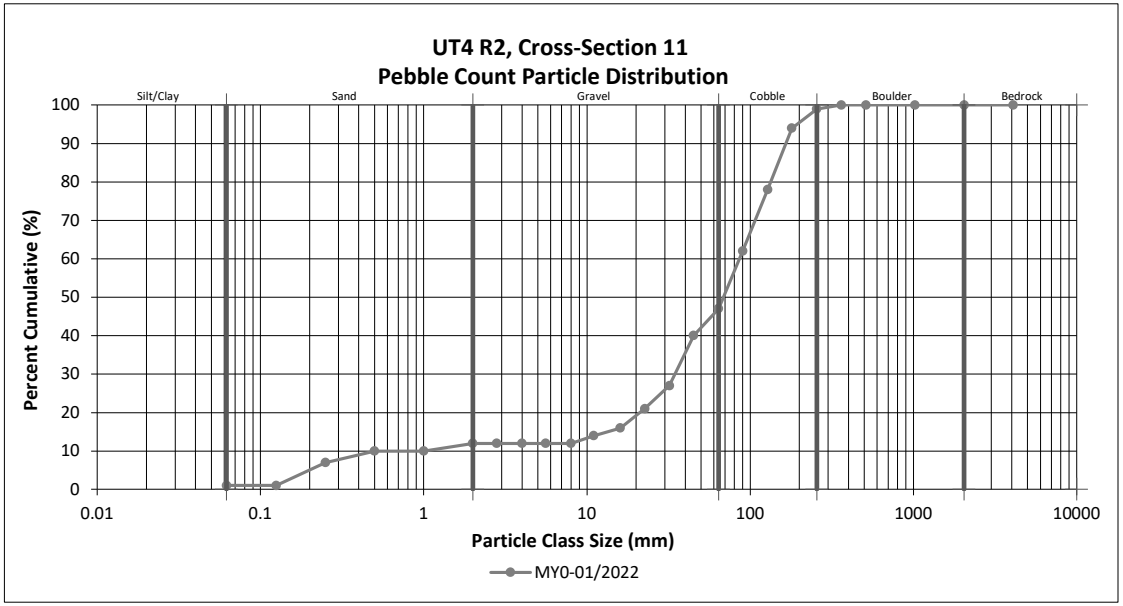
Cross-Section 10	
Channel materials (mm)	
D_{16} =	21.8
D_{35} =	39.6
D_{50} =	56.4
D_{84} =	125.5
D_{95} =	166.4
D_{100} =	256.0

Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT4 R2, Cross-Section 11

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	1	1
SAND	Very fine	0.062	0.125			1
	Fine	0.125	0.250	6	6	7
	Medium	0.25	0.50	3	3	10
	Coarse	0.5	1.0			10
	Very Coarse	1.0	2.0	2	2	12
GRAVEL	Very Fine	2.0	2.8			12
	Very Fine	2.8	4.0			12
	Fine	4.0	5.6			12
	Fine	5.6	8.0			12
	Medium	8.0	11.0	2	2	14
	Medium	11.0	16.0	2	2	16
	Coarse	16.0	22.6	5	5	21
	Coarse	22.6	32	6	6	27
	Very Coarse	32	45	13	13	40
	Very Coarse	45	64	7	7	47
COBBLE	Small	64	90	15	15	62
	Small	90	128	16	16	78
	Large	128	180	16	16	94
	Large	180	256	5	5	99
BOULDER	Small	256	362	1	1	100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



Cross-Section 11	
Channel materials (mm)	
D_{16} =	16.0
D_{35} =	39.5
D_{50} =	68.5
D_{84} =	145.5
D_{95} =	193.1
D_{100} =	362.0

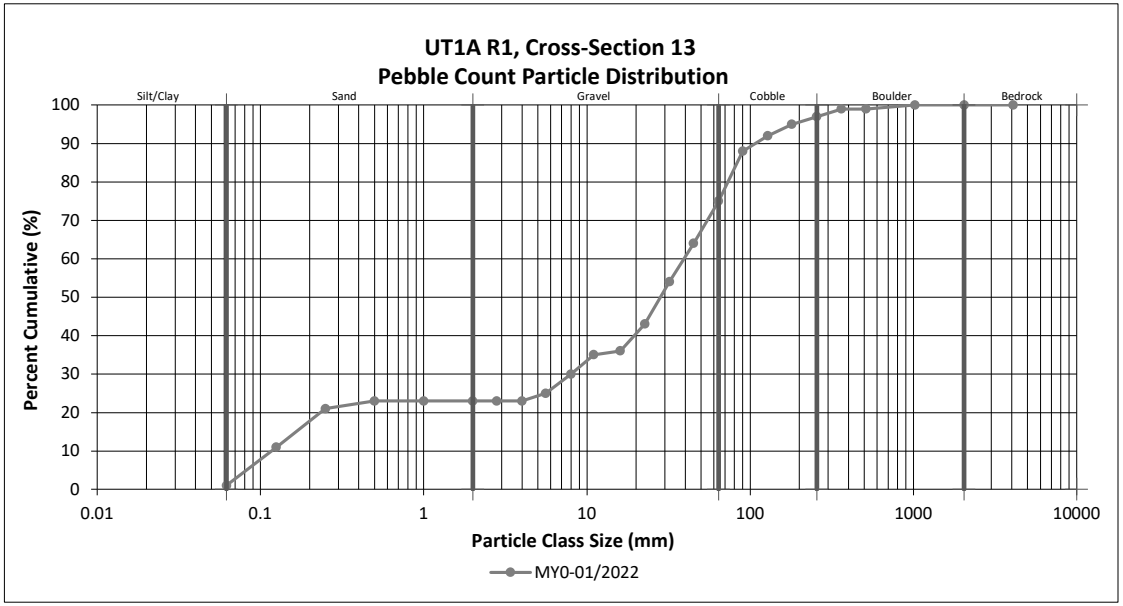
Reachwide and Cross-Section Pebble Count Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

UT1A R1, Cross-Section 13

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	1	1
SAND	Very fine	0.062	0.125	10	10	11
	Fine	0.125	0.250	10	10	21
	Medium	0.25	0.50	2	2	23
	Coarse	0.5	1.0			23
	Very Coarse	1.0	2.0			23
GRAVEL	Very Fine	2.0	2.8			23
	Very Fine	2.8	4.0			23
	Fine	4.0	5.6	2	2	25
	Fine	5.6	8.0	5	5	30
	Medium	8.0	11.0	5	5	35
	Medium	11.0	16.0	1	1	36
	Coarse	16.0	22.6	7	7	43
	Coarse	22.6	32	11	11	54
	Very Coarse	32	45	10	10	64
	Very Coarse	45	64	11	11	75
COBBLE	Small	64	90	13	13	88
	Small	90	128	4	4	92
	Large	128	180	3	3	95
	Large	180	256	2	2	97
BOULDER	Small	256	362	2	2	99
	Small	362	512			99
	Medium	512	1024	1	1	100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 13	
Channel materials (mm)	
D_{16} =	0.2
D_{35} =	11.0
D_{50} =	28.2
D_{84} =	81.0
D_{95} =	180.0
D_{100} =	1024.0



STREAM PHOTOGRAPHS

PHOTO POINT 1 UT7 – upstream *(1/25/2022)*

PHOTO POINT 1 UT7 – downstream *(1/25/2022)*

PHOTO POINT 2 UT7 – upstream *(1/25/2022)*

PHOTO POINT 2 UT7 – downstream *(1/25/2022)*

PHOTO POINT 3 UT to CC Reach 1 – upstream *(1/25/2022)*

PHOTO POINT 3 UT to CC Reach 1 – downstream *(1/25/2022)*

PHOTO POINT 4 UT to CC Reach 1 – upstream *(1/25/2022)*

PHOTO POINT 4 UT to CC Reach 1 – downstream *(1/25/2022)*

PHOTO POINT 5 UT to CC Reach 1 – upstream *(1/25/2022)*

PHOTO POINT 5 UT to CC Reach 1 – downstream *(1/25/2022)*

PHOTO POINT 6 UT to CC Reach 1 – upstream *(1/25/2022)*

PHOTO POINT 6 UT to CC Reach 1 – downstream *(1/25/2022)*

	
PHOTO POINT 7 UT to CC Reach 1 – upstream *(1/25/2022)*	**PHOTO POINT 7 UT to CC Reach 1 –** downstream *(1/25/2022)*
	
PHOTO POINT 8 UT to CC Reach 1 – upstream *(1/25/2022)*	**PHOTO POINT 8 UT to CC Reach 1 –** downstream *(1/25/2022)*
	
PHOTO POINT 9 UT to CC Reach 2 – upstream *(1/25/2022)*	**PHOTO POINT 9 UT to CC Reach 2 –** downstream *(1/25/2022)*

PHOTO POINT 10 UT to CC Reach 2 – upstream *(1/25/2022)*

PHOTO POINT 10 UT to CC Reach 2 – downstream *(1/25/2022)*

PHOTO POINT 11 UT to CC Reach 2 – upstream *(1/25/2022)*

PHOTO POINT 11 UT to CC Reach 2 – downstream *(1/25/2022)*

PHOTO POINT 12 UT to CC Reach 2 – upstream *(1/25/2022)*

PHOTO POINT 12 UT to CC Reach 2 – downstream *(1/25/2022)*

	
PHOTO POINT 13 UT6– upstream *(1/25/2022)*	**PHOTO POINT 13 UT6 –** downstream *(1/25/2022)*
	
PHOTO POINT 14 UT6 – upstream *(1/25/2022)*	**PHOTO POINT 14 UT6 –** downstream *(1/25/2022)*
	
PHOTO POINT 15 Hillside Tributary– upstream *(1/25/2022)*	**PHOTO POINT 15 Hillside Tributary–** downstream *(1/25/2022)*

PHOTO POINT 16 UT5 Reach 1 – upstream *(1/25/2022)*

PHOTO POINT 16 UT5 Reach 1 – downstream *(1/25/2022)*

PHOTO POINT 17 UT5 Reach 2 – upstream *(1/25/2022)*

PHOTO POINT 17 UT5 Reach 2– downstream *(1/25/2022)*

PHOTO POINT 18 UT4 Reach 1 – upstream *(1/25/2022)*

PHOTO POINT 18 UT4 Reach 1 – downstream *(1/25/2022)*

PHOTO POINT 19 UT4 Reach 1 – upstream *(1/25/2022)*

PHOTO POINT 19 UT4 Reach 1 – downstream *(1/25/2022)*

PHOTO POINT 20 UT4 Reach 1 – upstream *(1/25/2022)*

PHOTO POINT 20 UT4 Reach 1 – downstream *(1/25/2022)*

PHOTO POINT 21 UT4 Reach 2 – upstream *(1/25/2022)*

PHOTO POINT 21 UT4 Reach 2 – downstream *(1/25/2022)*

	
PHOTO POINT 22 UT4 Reach 2 – upstream *(1/25/2022)*	**PHOTO POINT 22 UT4 Reach 2 –** downstream *(1/25/2022)*
	
PHOTO POINT 23 UT3 – upstream *(1/25/2022)*	**PHOTO POINT 23 UT3 –** downstream *(1/25/2022)*
	
PHOTO POINT 24 UT3A – upstream *(1/25/2022)*	**PHOTO POINT 24 UT3A –** downstream *(1/25/2022)*

PHOTO POINT 25 UT1A Reach 1– upstream *(1/25/2022)*

PHOTO POINT 25 UT1A Reach 1 – downstream *(1/25/2022)*

PHOTO POINT 26 UT1A Reach 1– upstream *(1/25/2022)*

PHOTO POINT 26 UT1A Reach 1– downstream *(1/25/2022)*

PHOTO POINT 27 UT1A Reach 1– upstream *(1/25/2022)*

PHOTO POINT 27 UT1A Reach 1– downstream *(1/25/2022)*

	
PHOTO POINT 28 UT1A Reach 1– upstream *(1/25/2022)*	**PHOTO POINT 28 UT1A Reach 1–** downstream *(1/25/2022)*
	
PHOTO POINT 29 UT1A Reach 2 – upstream *(1/25/2022)*	**PHOTO POINT 29 UT1A Reach 2–** downstream *(1/25/2022)*
	
PHOTO POINT 30 UT1 Reach 1– upstream *(1/25/2022)*	**PHOTO POINT 30 UT1 Reach 1–** downstream *(1/25/2022)*

	
PHOTO POINT 31 UT1 Reach 2– upstream *(1/25/2022)*	**PHOTO POINT 31 UT1 Reach 2 –** downstream *(1/25/2022)*

INTERNAL CROSSING PHOTOGRAPHS

UT to Crab Creek Reach 1 Crossing 1 (102+83) **–** inlet *(9/28/2021)*

UT to Crab Creek Reach 1 Crossing 1 (103+33) **–** outlet *(9/28/2021)*

UT to Crab Creek R1 Crossing 2 (114+46) **–** inlet *(9/28/2021)*

UT to Crab Creek R1 Crossing 2 (114+98) **–** outlet *(9/28/2021)*

UT1A Reach 1 Crossing (154+73) **–** inlet *(9/28/2021)*

UT1A Reach 1 Crossing (155+17) **–** outlet *(9/28/2021)*

	
UT4 Reach 1 Crossing (404+33) **–** inlet *(9/29/2021)*	**UT4 Reach 1 Crossing** (404+74) **–** outlet *(9/29/2021)*
	
UT4 Reach 2 Crossing (413+54) **–** inlet *(9/29/2021)*	**UT4 Reach 2 Crossing** (413+96) **–** outlet *(9/29/2021)*
	
UT6 Crossing (605+26) **–** inlet *(9/28/2021)*	**UT6 Crossing** (605+71) **– o**utlet *(9/28/2021)*

APPENDIX 3. Vegetation Plot Data

Table 8. Vegetation Performance Standards Summary Table
Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Vegetation Performance Standards Summary Table												
	Veg Plot 1 F				Veg Plot 2 F				Veg Plot 3 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	486	2	5	0	607	2	6	0	648	2	6	0
	Veg Plot 4 F				Veg Plot 5 F				Veg Plot 6 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	486	2	5	0	405	2	8	0	688	2	8	0
	Veg Plot 7 F				Veg Plot 8 F				Veg Plot 9 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	445	2	6	0	405	2	6	0	364	2	4	0
	Veg Plot Group 1 R				Veg Plot Group 2 R				Veg Plot Group 3 R			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	364	2	7	0	567	2	10	0	567	2	7	0
	Veg Plot Group 4 R				Veg Plot Group 5 R							
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives				
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	445	2	7	0	324	2	6	0				

*Each monitoring year represents a different plot for the random vegetation plot "groups". Random (mobile) plots are denoted with an R, and fixed (permanent) plots with an F.

Table 9a. Vegetation Plot Data

Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 0 - 2022

Planted Acreage	17.7
Date of Initial Plant	2022-01-15
Date(s) of Supplemental Plant(s)	
Date(s) Mowing	
Date of Current Survey	2022-01-24
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Acer negundo	boxelder	Tree	FAC					3	3		
	Alnus serrulata	hazel alder	Tree	OBL			2	2				
	Betula nigra	river birch	Tree	FACW	1	1	1	1	1	1		
	Carpinus caroliniana	American hornbeam	Tree	FAC			1	1			2	2
	Diospyros virginiana	common persimmon	Tree	FAC	1	1					2	2
	Euonymus americanus	bursting-heart	Shrub	FAC					1	1	1	1
	Lindera benzoin	northern spicebush	Tree	FAC			1	1				
	Liriodendron tulipifera	tuliptree	Tree	FACU					5	5		
	Oxydendrum arboreum	sourwood	Shrub	UPL								
	Physocarpus opulifolius	common ninebark	Shrub	FACW								
	Platanus occidentalis	American sycamore	Tree	FACW	6	6	7	7	2	2	6	6
	Prunus serotina	black cherry	Tree	FACU								
	Quercus alba	white oak	Tree	FACU	3	3						
	Quercus rubra	northern red oak	Tree	FACU	1	1					1	1
	Sambucus canadensis	American black elderberry	Tree				3	3	4	4		
Sum	Performance Standard				12	12	15	15	16	16	12	12
Post Mitigation Plan Species	**Aesculus sylvatica**	**painted buckeye**	**Tree**	**FAC**							**1**	**1**
	Morus rubra	**red mulberry**	**Tree**	**FACU**								
Sum	Proposed Standard				12	12	15	15	16	16	13	13
Mitigation Plan Performance Standard	Current Year Stem Count					12		15		16		12
	Stems/Acre					486		607		648		486
	Species Count					5		6		6		5
	Dominant Species Composition (%)					50		47		31		50
	Average Plot Height (ft.)					2		2		2		2
	% Invasives					0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					12		15		16		13
	Stems/Acre					486		607		648		526
	Species Count					5		6		6		6
	Dominant Species Composition (%)					50		47		31		50
	Average Plot Height (ft.)					2		2		2		2
	% Invasives					0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.

2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).

3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 9b. Vegetation Plot Data
Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Planted Acreage	17.7
Date of Initial Plant	2022-01-15
Date(s) of Supplemental Plant(s)	
Date(s) Mowing	
Date of Current Survey	2022-01-24
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 5 F		Veg Plot 6 F		Veg Plot 7 F		Veg Plot 8 F		Veg Plot 9 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Acer negundo	boxelder	Tree	FAC			2	2						
	Alnus serrulata	hazel alder	Tree	OBL			1	1						
	Betula nigra	river birch	Tree	FACW			4	4			1	1		
	Carpinus caroliniana	American hornbeam	Tree	FAC	1	1	1	1						
	Diospyros virginiana	common persimmon	Tree	FAC	1	1			2	2			1	1
	Euonymus americanus	bursting-heart	Shrub	FAC			1	1			3	3	2	2
	Lindera benzoin	northern spicebush	Tree	FAC	1	1	1	1						
	Liriodendron tulipifera	tuliptree	Tree	FACU					2	2	1	1	2	2
	Oxydendrum arboreum	sourwood	Shrub	UPL	1	1			1	1				
	Physocarpus opulifolius	common ninebark	Shrub	FACW	1	1								
	Platanus occidentalis	American sycamore	Tree	FACW	1	1	3	3	2	2	1	1	4	4
	Prunus serotina	black cherry	Tree	FACU										
	Quercus alba	white oak	Tree	FACU	1	1			2	2	1	1		
	Quercus rubra	northern red oak	Tree	FACU	3	3			2	2	3	3		
	Sambucus canadensis	American black elderberry	Tree				4	4						
Sum	Performance Standard				10	10	17	17	11	11	10	10	9	9
Post Mitigation Plan Species	**Aesculus sylvatica**	**painted buckeye**	**Tree**	**FAC**	**1**	**1**			**1**	**1**	**1**	**1**	**3**	**3**
	Morus rubra	**red mulberry**	**Tree**	**FACU**									**2**	**2**
Sum	Proposed Standard				11	11	17	17	12	12	11	11	14	14
Mitigation Plan Performance Standard	Current Year Stem Count					10		17		11		10		9
	Stems/Acre					405		688		445		405		364
	Species Count					8		8		6		6		4
	Dominant Species Composition (%)					30		24		18		30		44
	Average Plot Height (ft.)					2		2		2		2		2
	% Invasives					0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					11		17		12		11		14
	Stems/Acre					445		688		486		445		567
	Species Count					9		8		7		7		6
	Dominant Species Composition (%)					30		24		18		30		44
	Average Plot Height (ft.)					2		2		2		2		2
	% Invasives					0		0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 9c. Vegetation Plot Data
Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Planted Acreage	17.7
Date of Initial Plant	2022-01-15
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2022-01-24
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 11 R Total	Veg Plot 12 R Total	Veg Plot 13 R Total	Veg Plot 14 R Total	Veg Plot 15 R Total
Species Included in Approved Mitigation Plan	Acer negundo	boxelder	Tree	FAC					
	Alnus serrulata	hazel alder	Tree	OBL	1	1			
	Betula nigra	river birch	Tree	FACW				1	
	Carpinus caroliniana	American hornbeam	Tree	FAC		2			1
	Diospyros virginiana	common persimmon	Tree	FAC		1	1	1	
	Euonymus americanus	bursting-heart	Shrub	FAC		1	1	1	
	Lindera benzoin	northern spicebush	Tree	FAC	1	1			
	Liriodendron tulipifera	tuliptree	Tree	FACU	2	1			2
	Oxydendrum arboreum	sourwood	Shrub	UPL			1	1	
	Physocarpus opulifolius	common ninebark	Shrub	FACW	1	2			
	Platanus occidentalis	American sycamore	Tree	FACW	2	3	3	4	1
	Prunus serotina	black cherry	Tree	FACU			1		1
	Quercus alba	white oak	Tree	FACU			3	1	1
	Quercus rubra	northern red oak	Tree	FACU	1	1	4	2	2
	Sambucus canadensis	American black elderberry	Tree		1	1			
Sum	Performance Standard				9	14	14	11	8
Post Mitigation Plan Species	**Aesculus sylvatica**	**painted buckeye**	**Tree**	**FAC**	**2**	**1**	**1**		**2**
	Morus rubra	**red mulberry**	**Tree**	**FACU**				**1**	**3**
Sum	Proposed Standard				11	15	15	12	13
Mitigation Plan Performance Standard	Current Year Stem Count				9	14	14	11	8
	Stems/Acre				364	567	567	445	324
	Species Count				7	10	7	7	6
	Dominant Species Composition (%)				22	21	29	36	25
	Average Plot Height (ft.)				2	2	2	2	2
	% Invasives				0	0	0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count				11	15	15	12	13
	Stems/Acre				445	607	607	486	526
	Species Count				8	11	8	8	8
	Dominant Species Composition (%)				22	21	29	36	25
	Average Plot Height (ft.)				2	2	2	2	2
	% Invasives				0	0	0	0	0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Bog Herbaceous Wetland Vegetation Plot Data

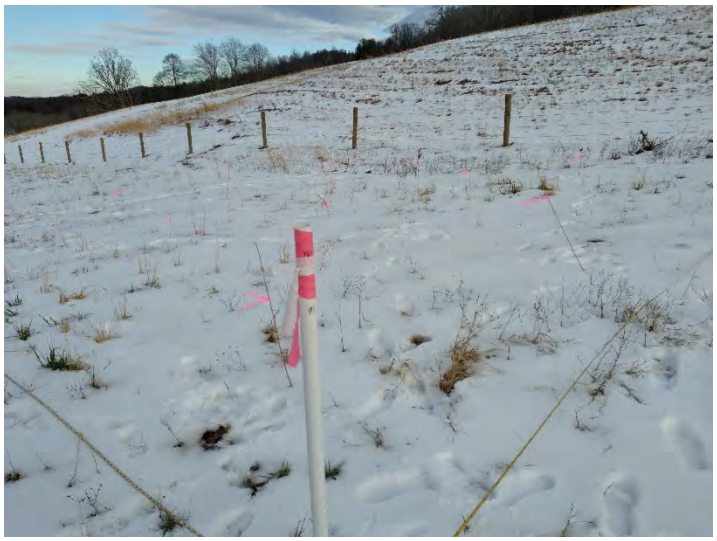
Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 0 - 2022

Bog Plot 1					
Absolute Plot Cover	**Species[1]**			**Wetland Indicator Status**	**Dominant Species?**
	Scientific Name	**Common Name**	**% of total cover**		
95%	*Juncus effusus*	Soft Rush	80%	FACW	Y
	Carex lurida	Shallow Sedge	5%	OBL	N
	Microstegium vimineum	Japanese Stiltgrass	5%	FAC	N
	Unknown grass sp.	N/A	5%	N/A	N

Bog Plot 2					
Absolute Plot Cover	**Species[1]**			**Wetland Indicator Status**	**Dominant Species?**
	Scientific Name	**Common Name**	**% of total cover**		
95%	*Juncus effusus*	Soft Rush	75%	FACW	Y
	Carex lurida	Shallow Sedge	5%	OBL	N
	Bidens laevis	Smoth Beggarticks	5%	OBL	N
	Microstegium vimineum	Japanese Stiltgrass	5%	FAC	N
	Unknown sedge sp.	N/A	5%	N/A	N

1. Plots were covered in snow at the time of the MY0 assessment. Dormant species were difficult to ID to species and a more thorough review will be conducted in MY1.

PERMANENT VEGETATION PLOT PHOTOGRAPHS

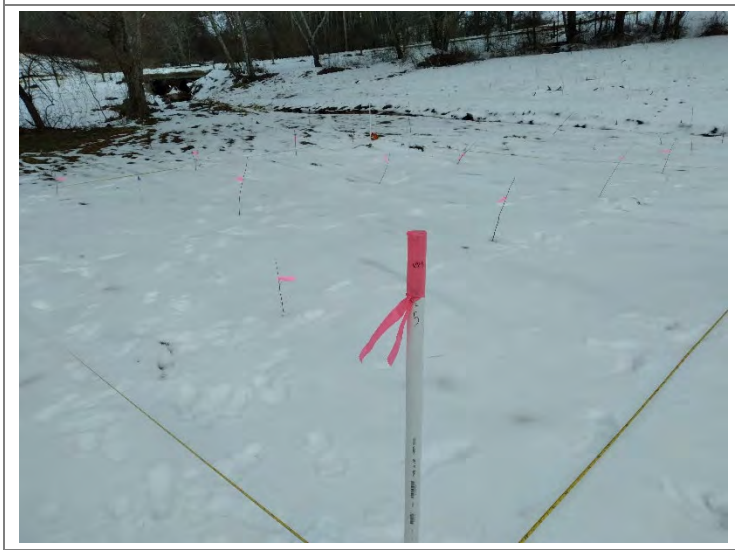


PERMANENT VEGETATION PLOT 1 *(1/27/2022)*

PERMANENT VEGETATION PLOT 2 *(1/27/2022)*

PERMANENT VEGETATION PLOT 3 *(1/27/2022)*

PERMANENT VEGETATION PLOT 4 *(1/27/2022)*



PERMANENT VEGETATION PLOT 5 *(1/27/2022)*

PERMANET VEGETATION PLOT 6 *(1/27/2022)*

PERMANENT VEGETATION PLOT 7 *(1/27/2022)*

PERMANENT VEGETATION PLOT 8 *(1/27/2022)*

PERMANENT VEGETATION PLOT 9 *(1/27/2022)*

MOBILE VEGETATION PLOT PHOTOGRAPHS

MOBILE VEGETATION PLOT 1 FACING NORTH *(1/27/2022)*

MOBILE VEGETATION PLOT 2 FACING NORTH *(1/27/2022)*

MOBILE VEGETATION PLOT 3 FACING NORTH *(1/27/2022)*

MOBILE VEGETATION PLOT 4 FACING NORTH *(1/27/2022)*

MOBILE VEGETATION PLOT 5 FACING NORTH *(1/27/2022)*

BOG VEGETATION PLOT PHOTOGRAPHS

	
BOG VEGETATION PLOT 1 *(1/27/2022)*	**BOG VEGETATION PLOT 2** *(1/27/2022)*

APPENDIX 4. Record Drawings and Sealed As-built Survey

March 21, 2022

Double H Farms Mitigation Site
Record Drawings
Alleghany County, NC
for
NCDEQ
Division of Mitigation Services

Vicinity Map
Not to Scale

STREAM ORIGINS		
NAME	NORTHING	EASTING
UT to CRAB CREEK	1016841	1414723
UT7	1016485	1414583
UT6	1016300	1415498
HILLSIDE TRIB	1017223	1415757
UT5	1017051	1416086
UT4	1018247	1414839
UT3	1017738	1416367
UT3A	1017857	1416375
UT1A	1018609	1414912
UT1	1018780	1415957

RECORD DRAWINGS
ISSUED MARCH 21, 2022

Sheet Index

Project Directory

Engineering:
Wildlands Engineering, Inc
License No. F-0831
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Jeff Keaton, PE
704-332-7754

Surveying:
Kee Mapping and Surveying, PA
88 Central Avenue
Asheville, NC 28801
Phillip B. Kee, PLS
828-575-9021

Owner:
NC DEQ - Division of
Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699
Harry Tsomides
828-545-7057

DMS Project No. 100082
USACE Action ID No. 2018-01771

New River Basin 05050001

NC DWR# 20181270

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Fax: 704.332.3306
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON KEATON

Double H Farms Mitigation Site Record Drawing
Alleghany County, North Carolina

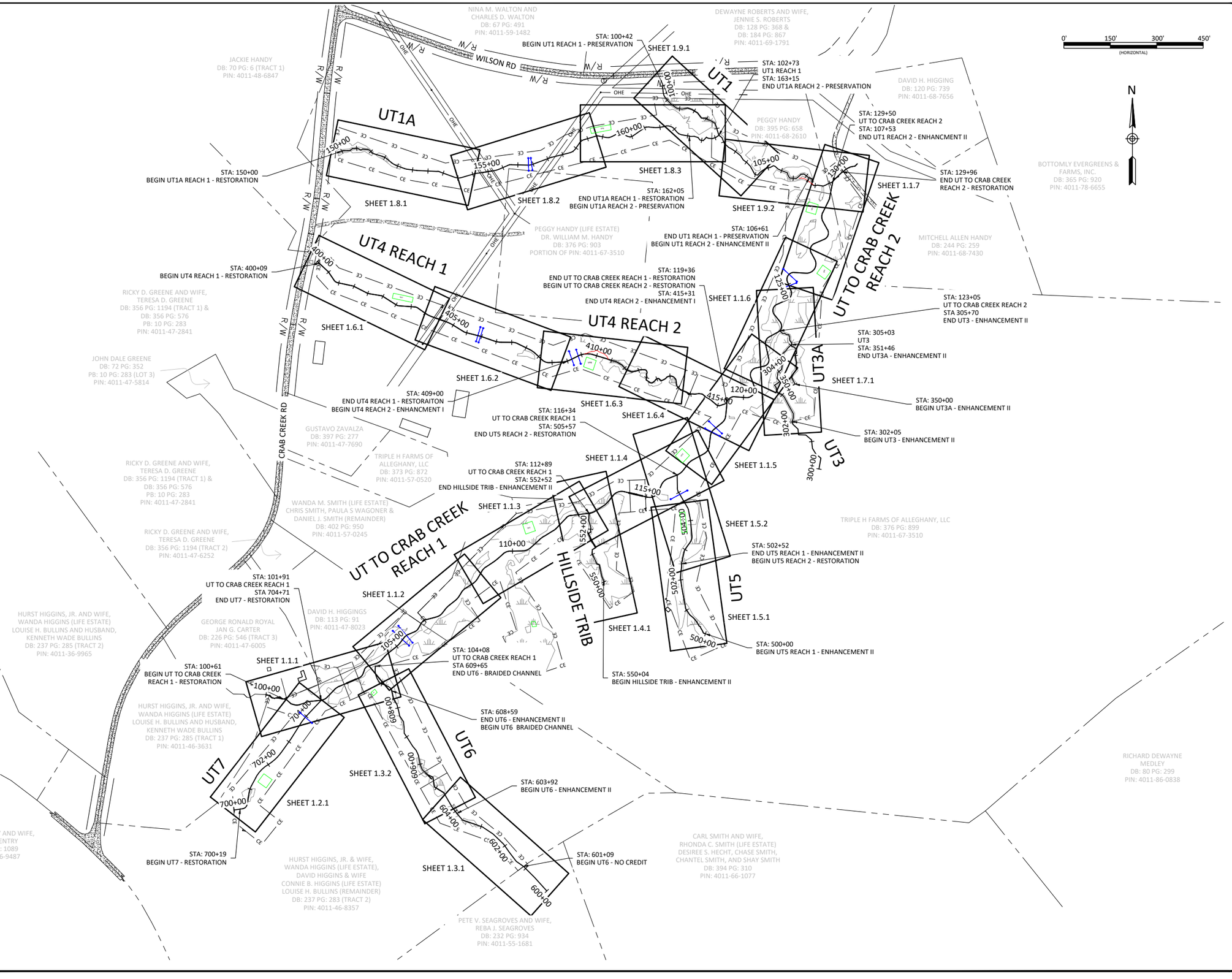
Title Sheet

Revisions:

Date: March 21, 2022
Job Number: 105-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 0.1

March 21, 2022



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Tel: 704.332.7754
Fax: 704.332.3306
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFF KEVERSON NOVEMBER 2, 2021

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

Project Overview

Revisions:

Date:	March 21, 2022
Job Number:	005-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	ICK

Sheet 0.2

x:\Shared\Projects\005-02174 double h farms\monitoring\baseline monitoring\Plans\AB-02174 - Project Overview.dwg

March 21, 2022

Pre-Construction Features

- Pre-Construction Property Line
- Pre-Construction NCDOT Right-of-Way (R/W)
- Pre-Construction Top of Bank (TOB)
- Pre-Construction Overhead Utility Line (OHE)
- Pre-Construction Overhead Utility Easement (OUE)
- Pre-Construction Fence (X)
- Pre-Construction Storm Pipe
- Pre-Construction Wetland
- Pre-Construction Road
- Pre-Construction Rip Rap
- Pre-Construction Tree
- Pre-Construction Utility Pole

Design Features

- Design Alignment
- Design Major Contour (5' Interval) (100)
- Design Minor Contour
- Design Permanent Culvert
- Design Woven Wire Fence
- Design Barbed Wire Fence
- Design 8' Double Gate
- Design 12' Single Gate

Design Structures

- Proposed Various Constructed Riffles
- Proposed Cascading Riffle/Rock Cascade
- Proposed Brush Toe
- Proposed Vegetated Soil Lift
- Proposed BMP
- Proposed Log Sill
- Proposed Cover Log
- Proposed Log J-hook
- Proposed Rock Sill
- Proposed Boulder J-hook with Sill

Asbuilt Features

- Asbuilt Alignment (10+00)
- Asbuilt Bankfull
- Recorded CE (CE)
- Recorded Internal Crossing (CE-IX)
- Asbuilt LOD (LOD)
- Asbuilt Major Contour (5' Interval) (100)
- Asbuilt Minor Contour
- Asbuilt Permanent Culvert
- Asbuilt Fence (X)
- Asbuilt 8' Double Gate
- Asbuilt 12' Single Gate

Asbuilt Structures

- Asbuilt Various Constructed Riffles
- Asbuilt Cascading Riffle/Rock Cascade/RipRap
- Asbuilt Brush Toe
- Asbuilt Vegetated Soil Lift
- Asbuilt BMP
- Asbuilt Gravel Farm Road
- Asbuilt Soil Farm Road
- Asuilt Boulder Toe
- Asbuilt Log Sill
- Asbuilt Lunker Log
- Asbuilt Log J-hook
- Asbuilt Rock Sill
- Asbuilt Rock J-hook with Sill
- Asbuilt Log J-Hook with Sill
- Photo Point (PP #)
- Permanent Vegetation Plot (VP #)
- Bog Plot (BP #)
- Barotroll
- Stream Gage (SG #)
- Ground Water Gage (GWG #)
- Crest Gage (CG #)
- Monitoring Cross Section (XS #)

Project Notes:

1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON C. KLEIN

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

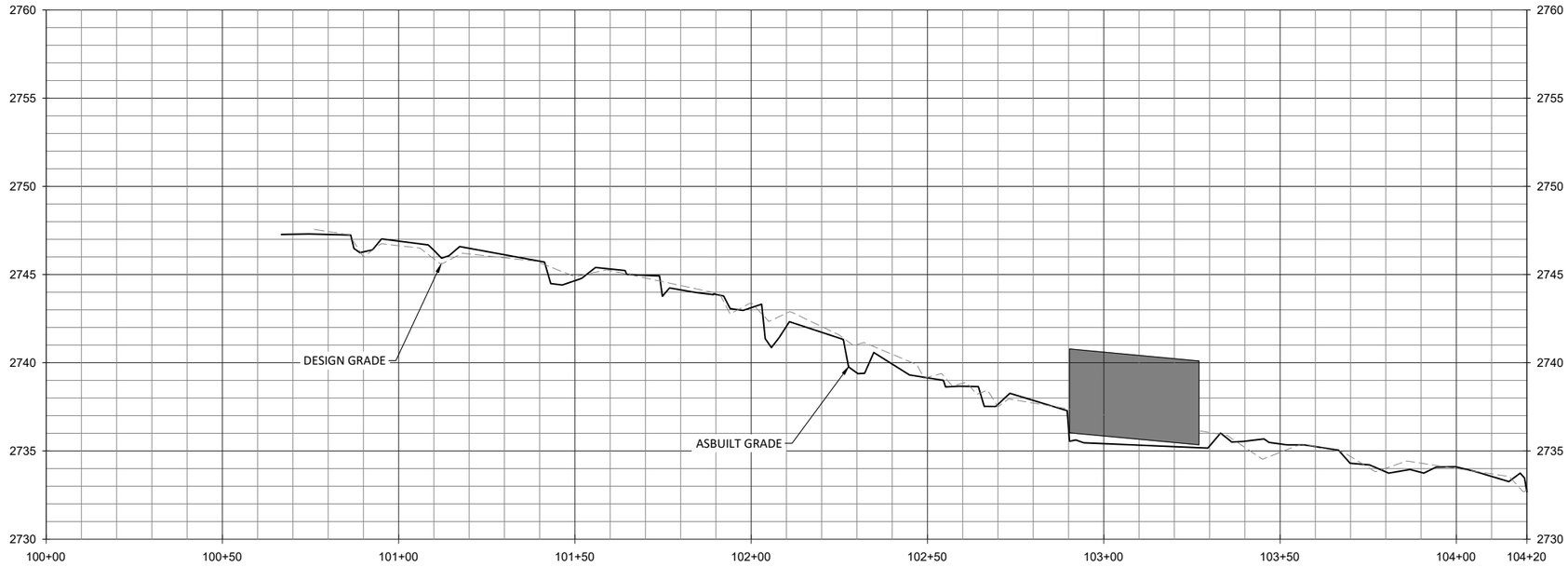
General Notes and Symbols

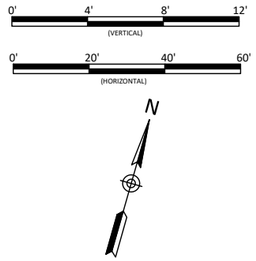
Revisions:

Date: March 21, 2022
Job Number: 005-02174
Project Engineer: JNK
Drawn By: AMK
Checked By: JCK

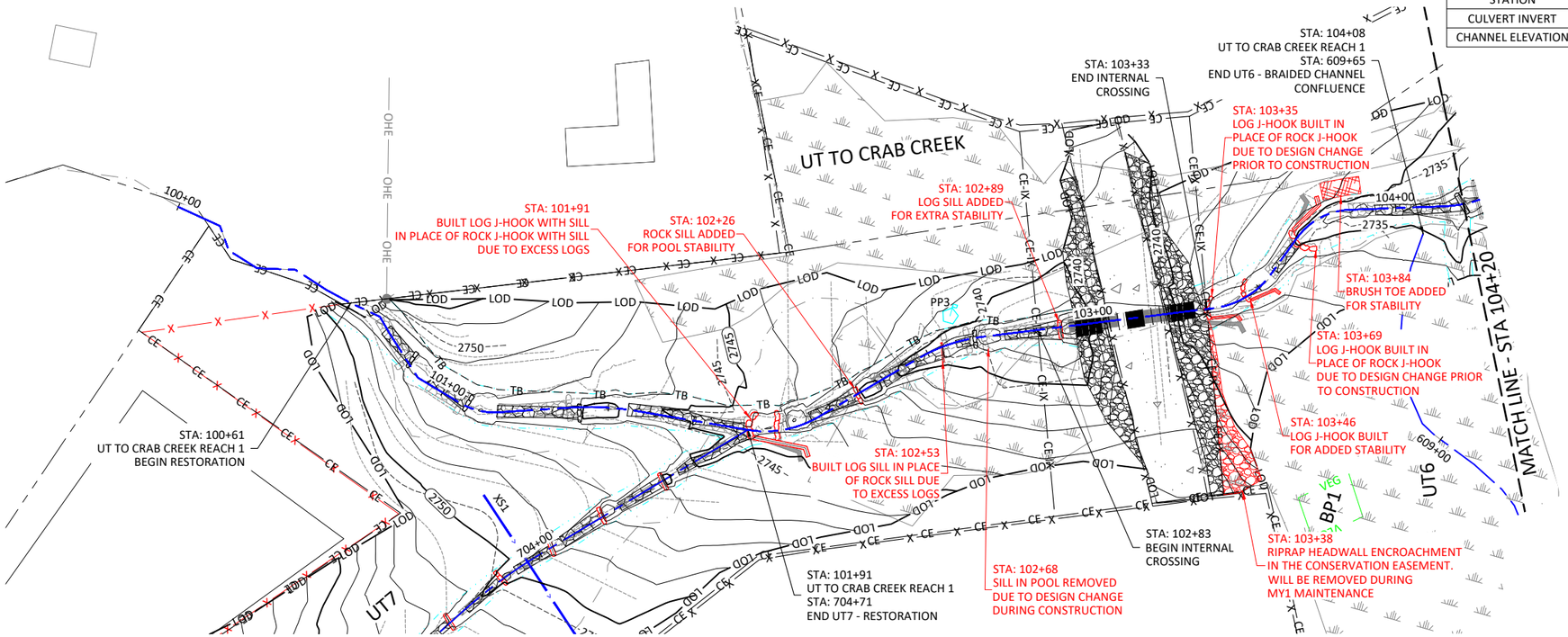
Sheet 0.3

March 21, 2022





UTCC R1 US (83"x57" ARCHED CMP)				
	IN (DESIGN)	IN (AS-BUILT)	OUT (DESIGN)	OUT (AS-BUILT)
STATION	102+93	102+90	103+27	103+27
CULVERT INVERT	2736.03	2735.46	2735.35	2735.16
CHANNEL ELEVATION	2737.03	2735.55	2736.35	2735.18



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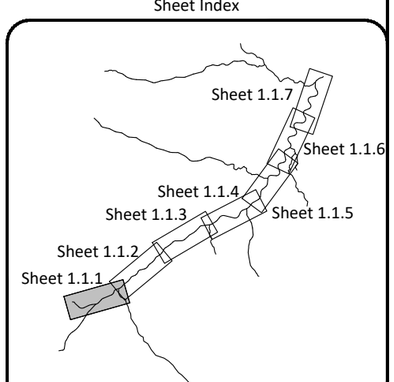

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY T. FOWLER

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

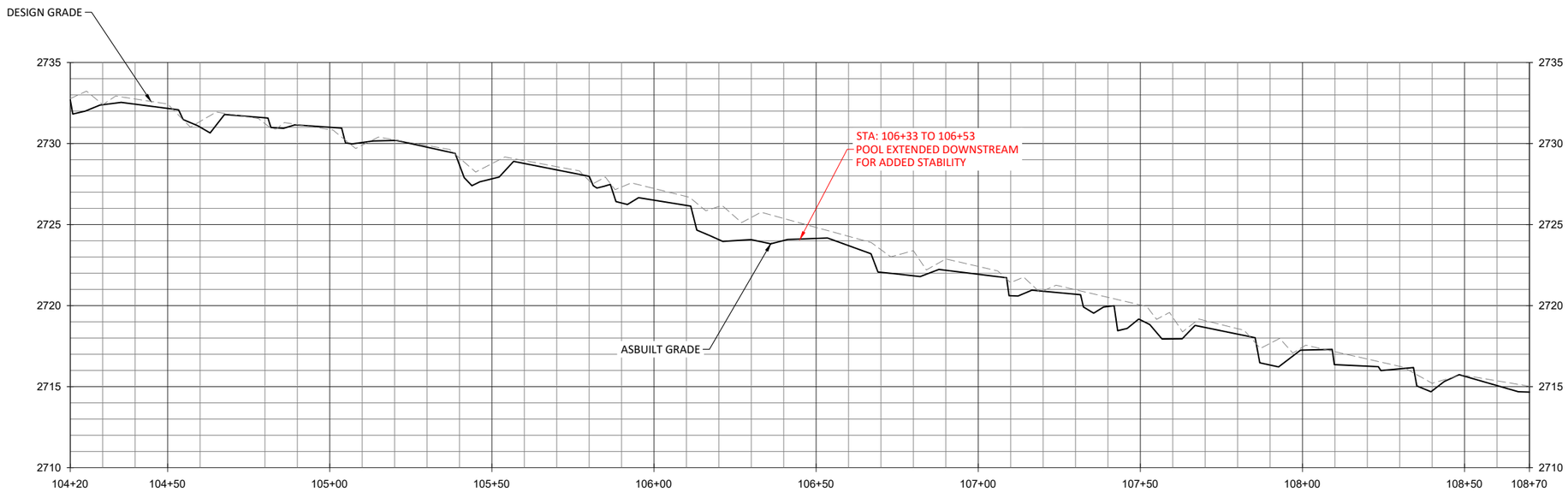
UT To Crab Creek Reach 1
Stream Plan and Profile

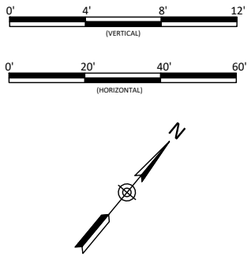
Revisions:

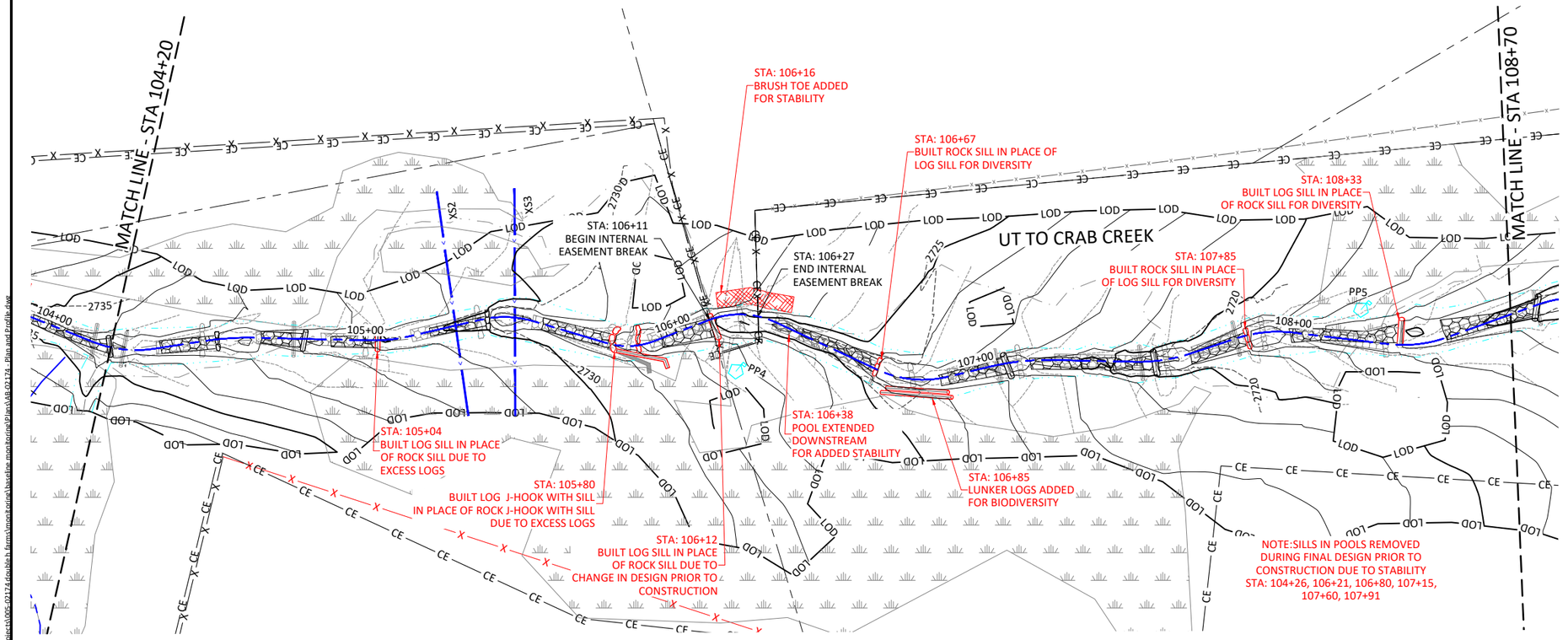
Date:	March 21, 2022
Job Number:	065-02124
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	KPK

Sheet 1.1.1

March 21, 2022







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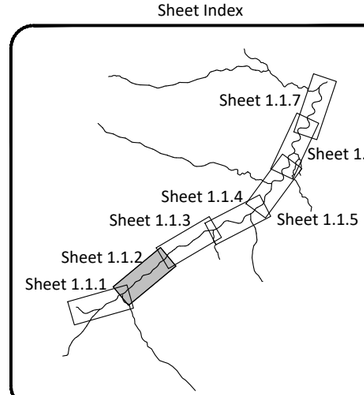

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY T. SCHWERT

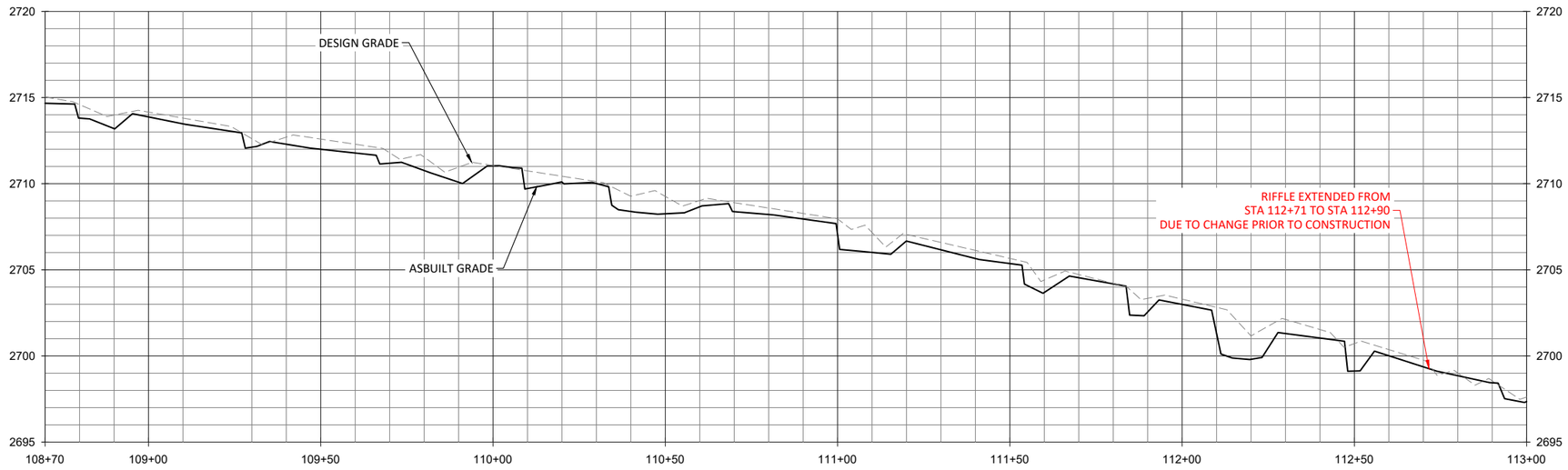
Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina
UT To Crab Creek Reach 1
Stream Plan and Profile

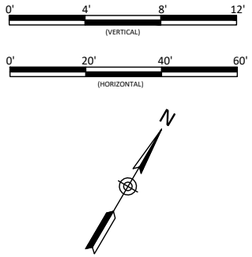
Revisions:

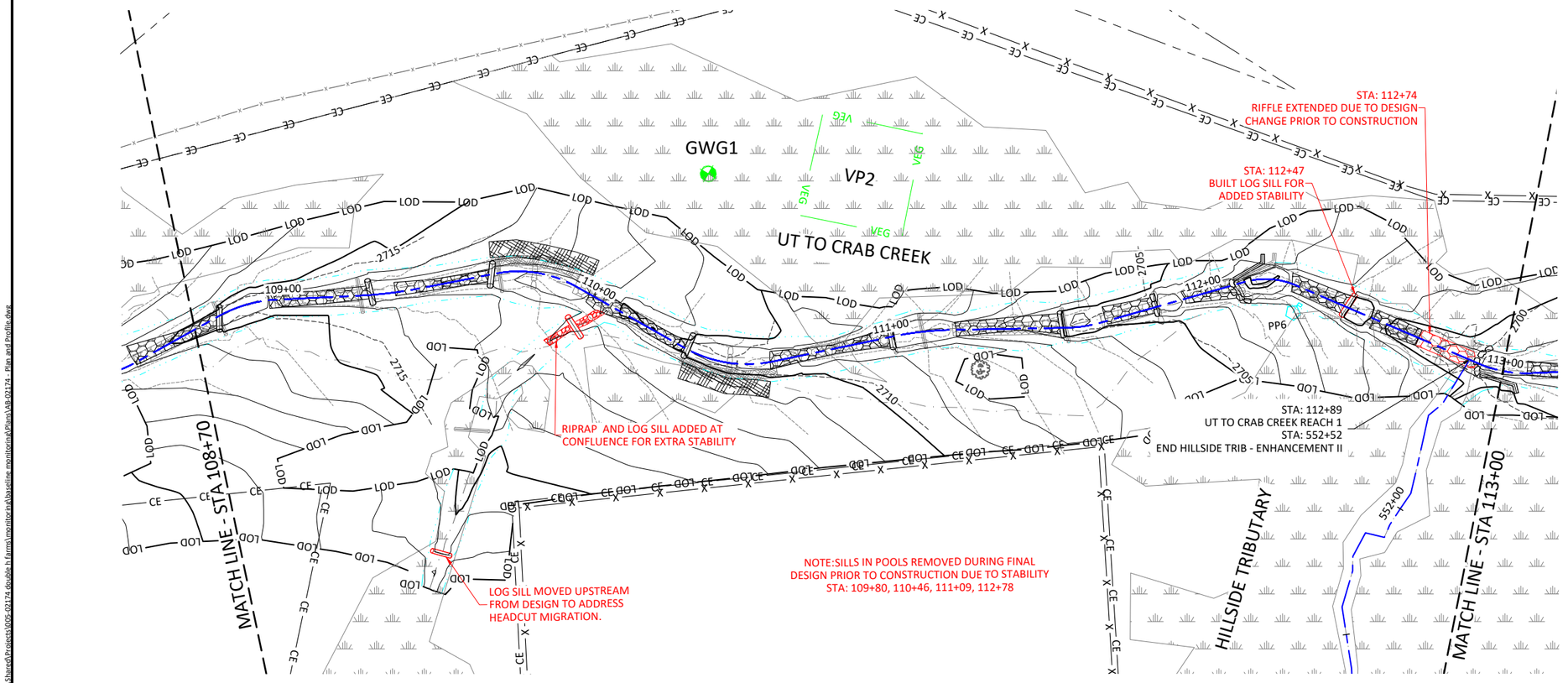
Date:	March 21, 2022
Job Number:	095-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Sheet 1.1.2

March 21, 2022







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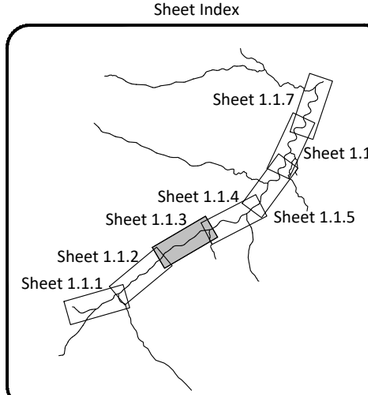

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY T. KEEVER

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT To Crab Creek Reach 1
Stream Plan and Profile

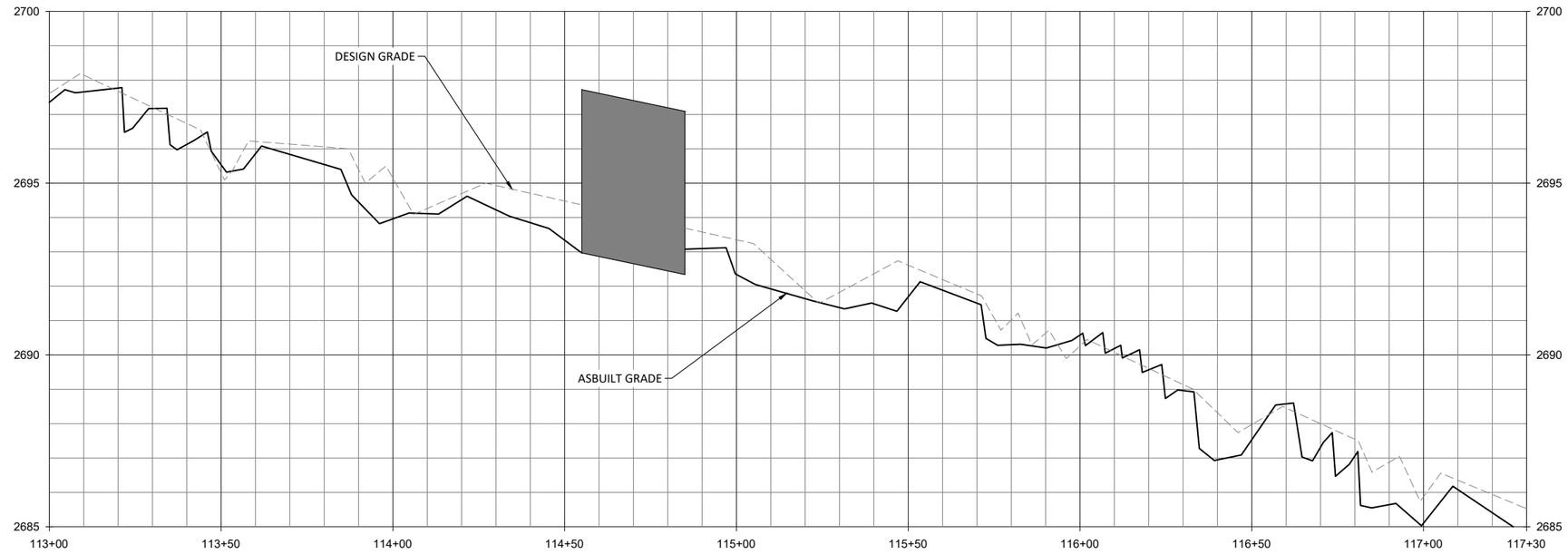
Revisions:

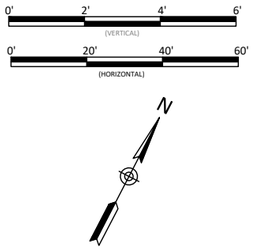
Date: March 21, 2022
Job Number: 095-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.1.3

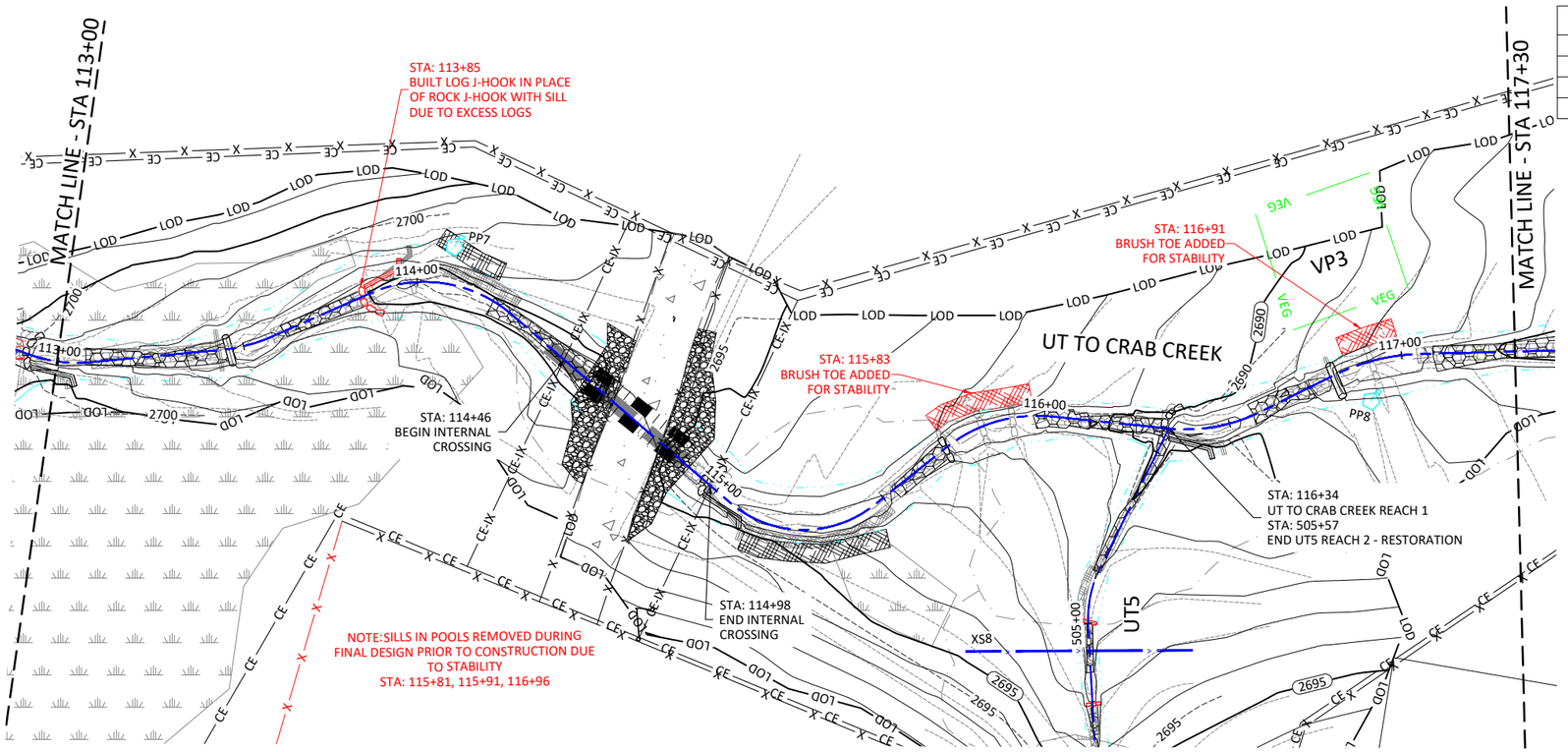
x:\Shared\Projects\095-02174 double h farms\monitoring\as-built\Plans\As-Built 02174 - Plan and Profile.dwg

March 21, 2022

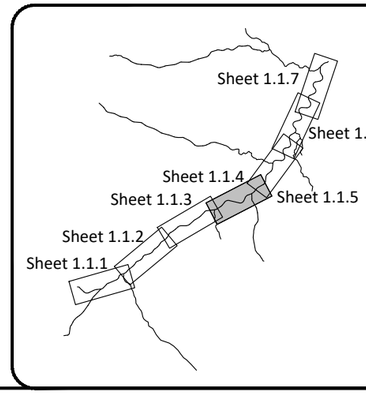




UTCC R1 DS (57"x38" ARCHED CMP)				
	IN (DESIGN)	IN (AS-BUILT)	OUT (DESIGN)	OUT (AS-BUILT)
STATION	114+58	114+55	114+88	114+85
CULVERT INVERT	2692.61	2692.97	2692.00	2692.34
CHANNEL ELEVATION	2693.61	2692.97	2693.00	2693.08



Sheet Index



WILDLANDS ENGINEERING
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Fax: 704.332.3306
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY M. NOLTE

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT To Crab Creek Reach 1
Stream Plan and Profile

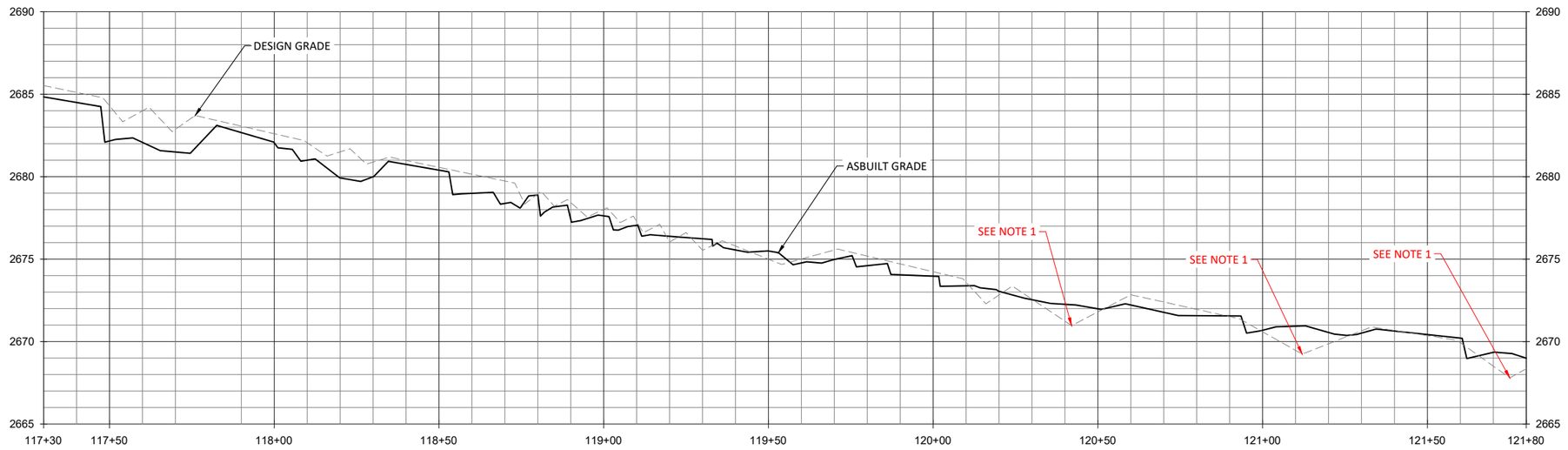
Revisions:

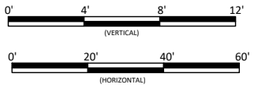
Date: March 21, 2022
Job Number: 095-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

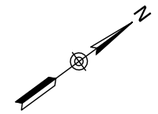
Sheet 1.1.4

x:\Shared\Projects\095-02174 double h farms\monitor\as\baseline monitoring\Plans\As-Built\2174 - Plan and Profile.dwg

March 21, 2022

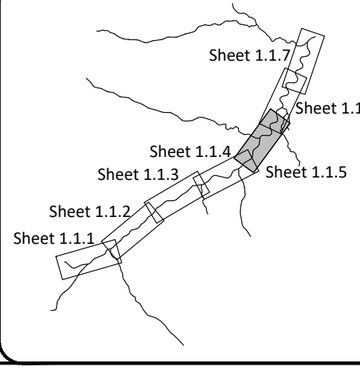






NOTES:
1. POOLS FILLED WITH SEDIMENT AT STA: 120+42, STA: 121+12, AND STA: 121+75. AS VEGETATION STABILIZES FLOODPLAIN, POOLS SHOULD CLEAR.
2. LOG SILLS AT STA: 119+10, 119+16, 119+25 REPLACED BY RIFFLE FROM 119+10 TO 119+36 DURING FINAL DESIGN PRIOR TO CONSTRUCTION.

Sheet Index



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Fax: 704.332.3306
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY T. FOWLER

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT To Crab Creek Reach 1 & Reach 2
Stream Plan and Profile

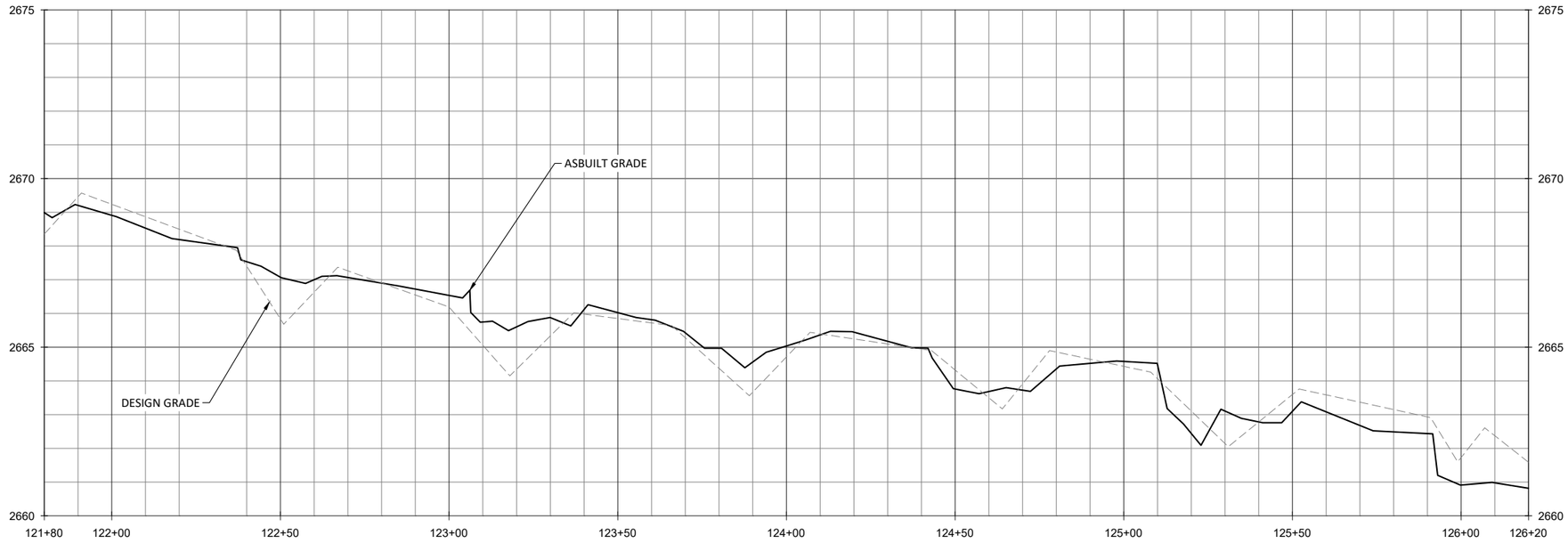
Revisions:

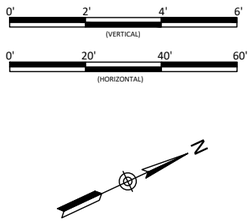
Date: March 21, 2022
Job Number: IMS-102174
Project Engineer: TNK
Drawn By: AMR
Checked By: JCK

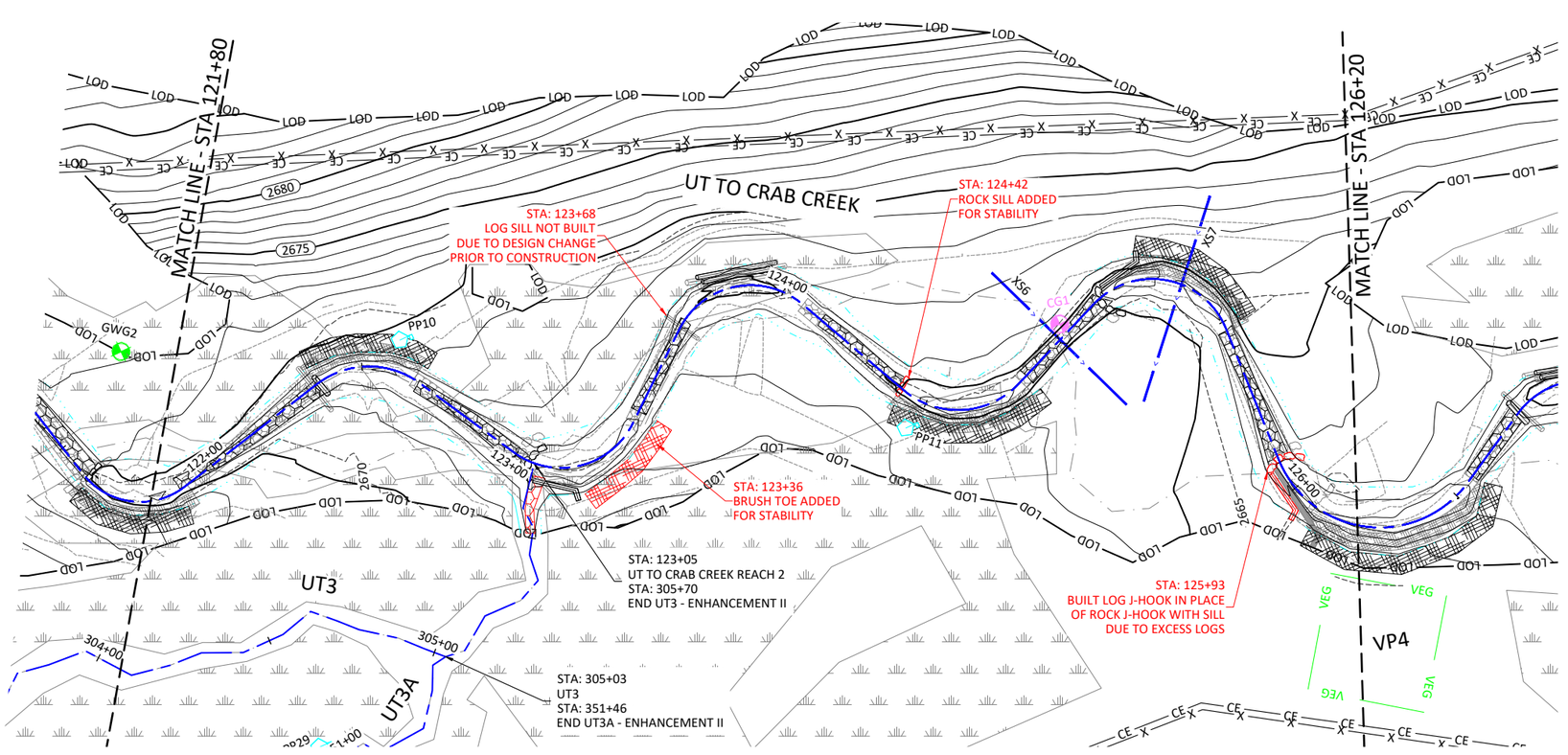
Sheet 1.1.5

March 21, 2022

NOTE: POOLS FILLED WITH SEDIMENT.
AS VEGETATION STABILIZES FLOODPLAIN, POOLS SHOULD CLEAR.







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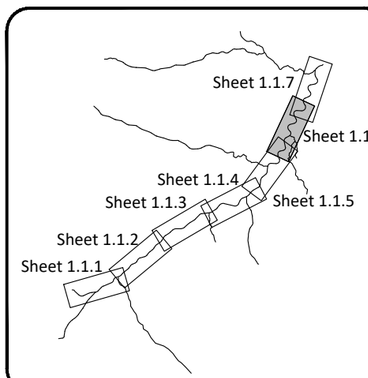

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Charlotte, NC 28203
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Fax: 704.332.3306
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY KEATON

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

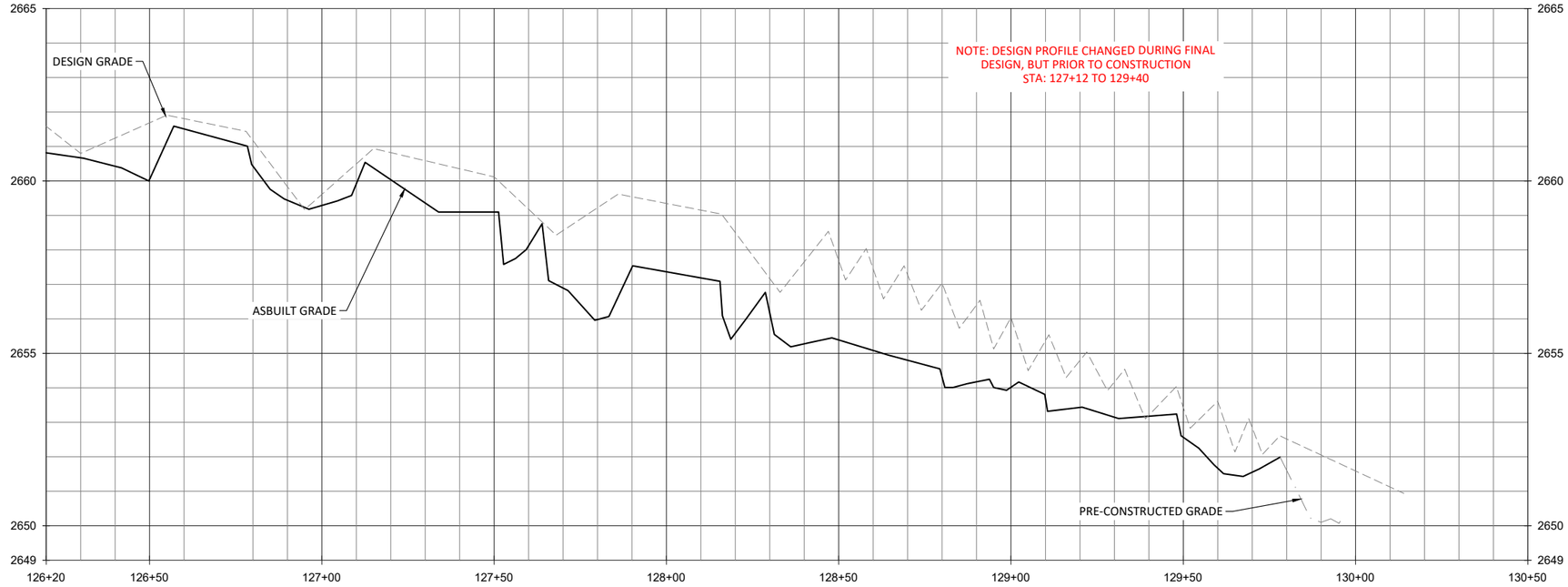
UT To Crab Creek Reach 2
Stream Plan and Profile

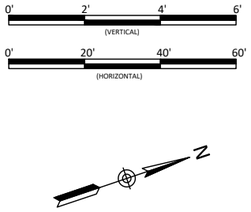
Revisions:

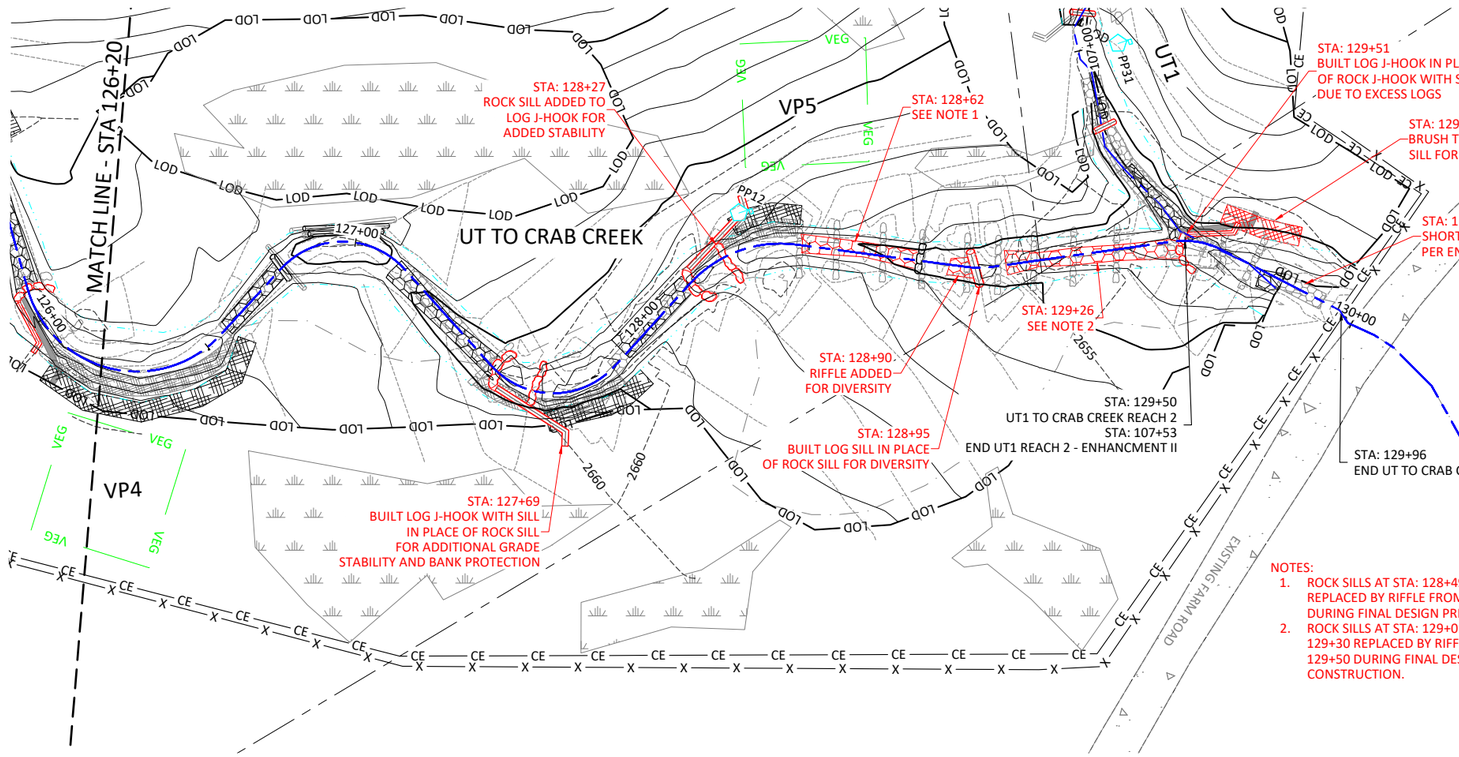
Date:	March 21, 2022
Job Number:	005-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Sheet 1.1.6

March 21, 2022

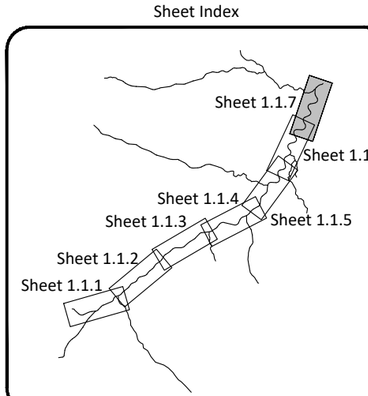






NOTES:
1. ROCK SILLS AT STA: 128+49, 128+59, 128+71 REPLACED BY RIFFLE FROM 128+49 TO 128+80 DURING FINAL DESIGN PRIOR TO CONSTRUCTION.
2. ROCK SILLS AT STA: 129+01, 129+10, 129+20, 129+30 REPLACED BY RIFFLE FROM 129+02 TO 129+50 DURING FINAL DESIGN PRIOR TO CONSTRUCTION.

Sheet Index



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Charlotte, NC 28203
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Fax: 704.332.3306
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY KEATON

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

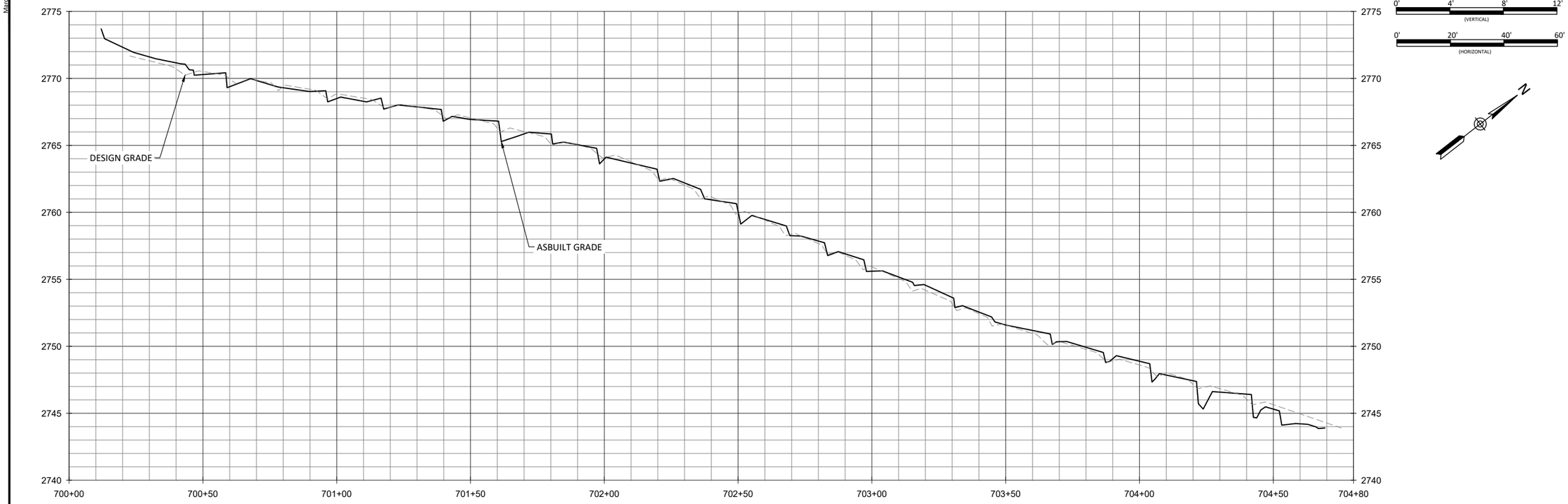
UT To Crab Creek Reach 2
Stream Plan and Profile

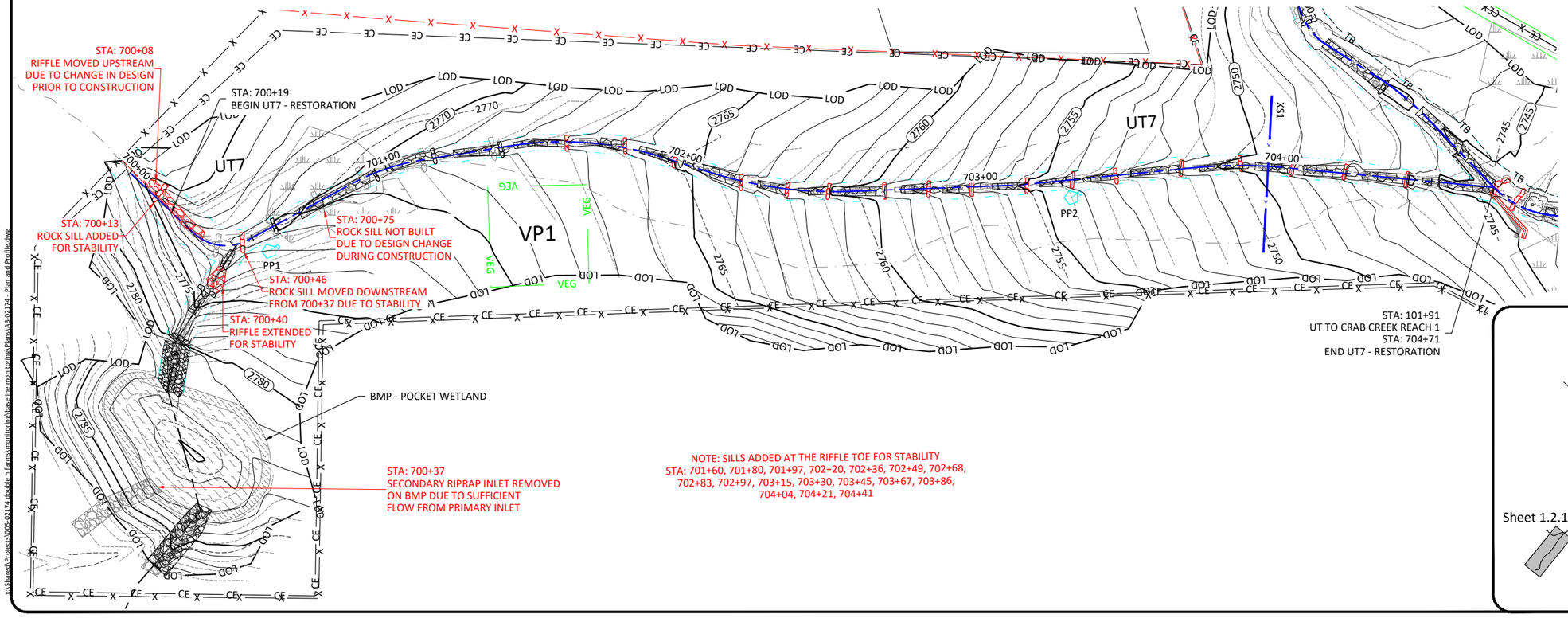
Revisions:

Date:	March 21, 2022
Job Number:	005-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Sheet 1.1.7

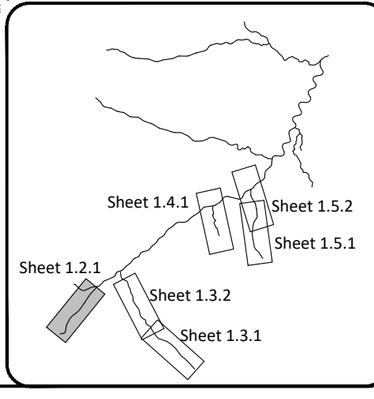
March 21, 2022





NOTE: SILLS ADDED AT THE RIFFLE TOE FOR STABILITY
STA: 701+60, 701+80, 701+97, 702+20, 702+36, 702+49, 702+68, 702+83, 702+97, 703+15, 703+30, 703+45, 703+67, 703+86, 704+04, 704+21, 704+41

Sheet Index



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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY T. KNOTTS

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

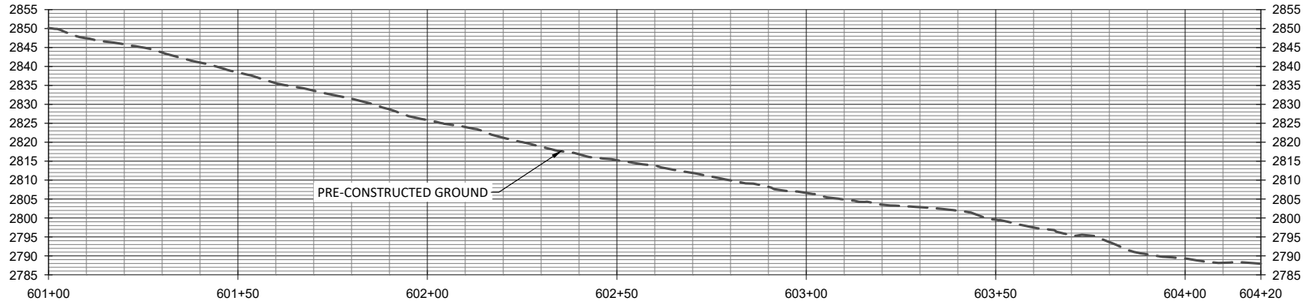
UT7 Reach 1
Stream Plan and Profile

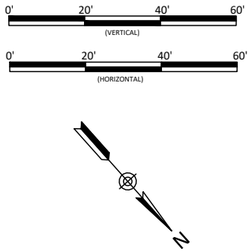
Date:	March 21, 2022
Job Number:	065-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Revisions:

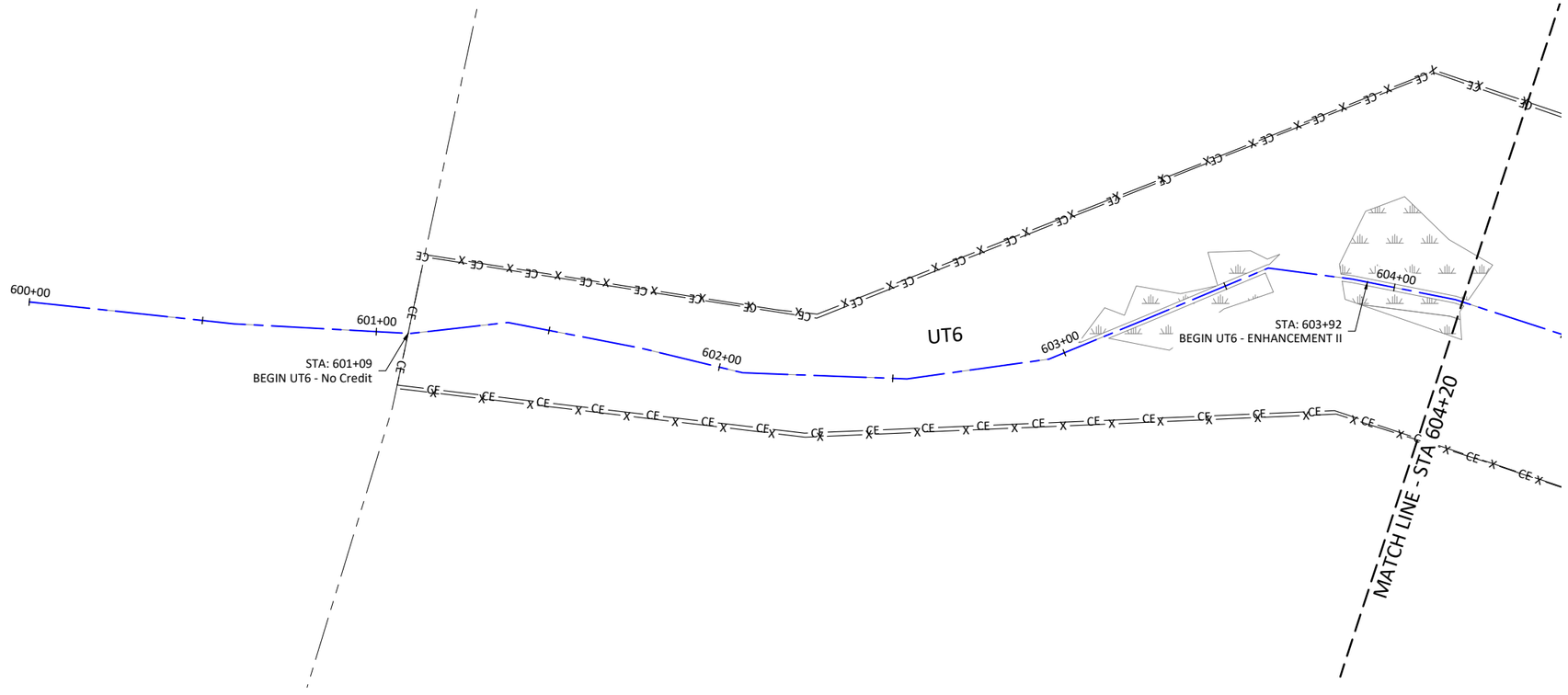
Sheet: 1.2.1

March 21, 2022

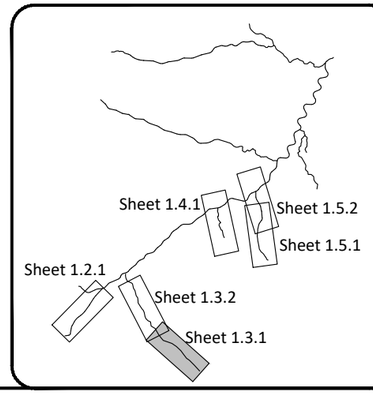




ENHANCEMENT II REACH TREATMENT:
1. EXCLUDE CATTLE
2. TREAT INVASIVE VEGETATION
3. SUPPLEMENTAL PLANTING- SEE PLANTING PLAN



Sheet Index



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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY L. KEATON

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT6 Reach 1
Stream Plan and Profile

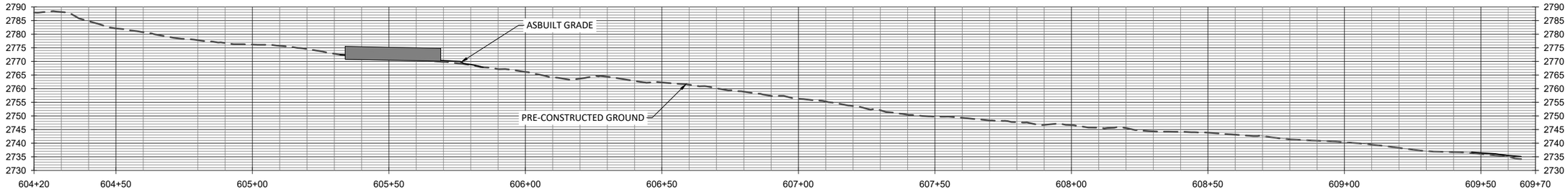
Revisions:

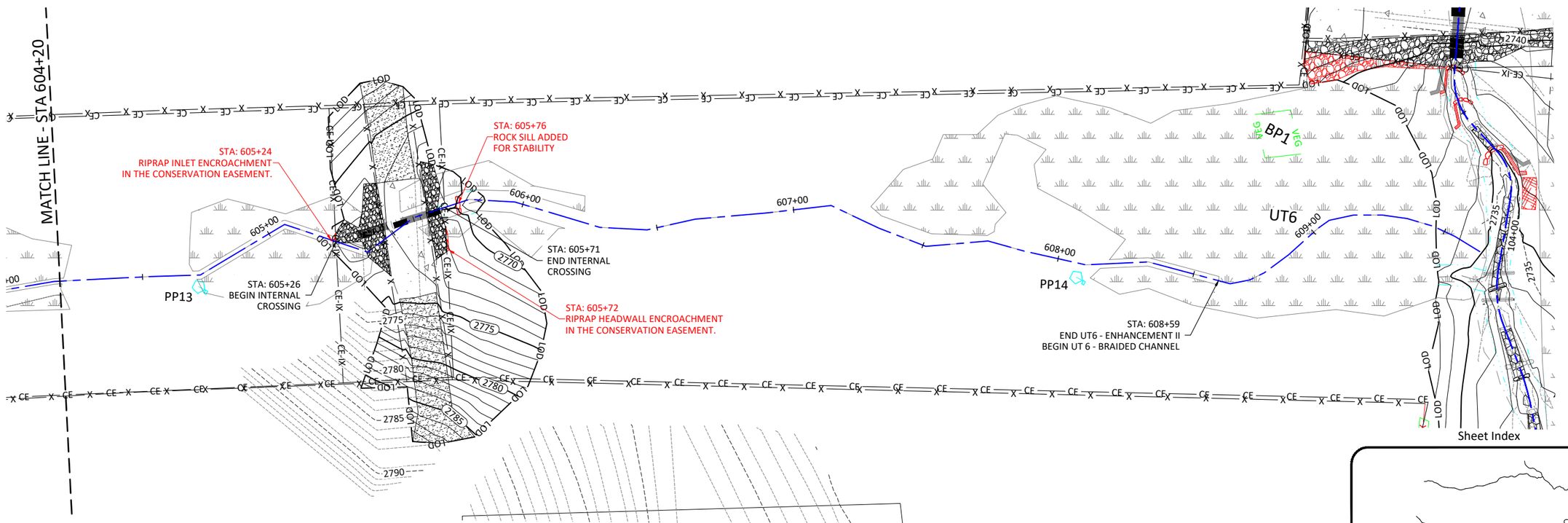
Date: March 21, 2022
Job Number: 005-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.3.1

x:\Shared\Projects\005-02174 double h farms\monitoring\baseline monitoring\Plans\Mit-02174 - Plan and Profile.dwg

March 21, 2022



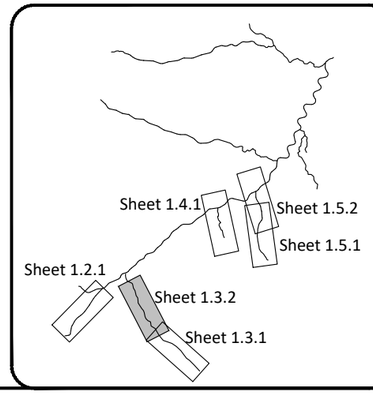


UT6 (24" CMP)				
	IN (DESIGN)	IN (AS-BUILT)	OUT (DESIGN)	OUT (AS-BUILT)
STATION	605+34	605+34	605+69	605+69
CULVERT INVERT	2770.28	2770.76	2770.08	2770.08
CHANNEL ELEVATION	2770.78	2772.30	2770.58	2769.88

ENHANCEMENT II REACH TREATMENT:
1. EXCLUDE CATTLE
2. TREAT INVASIVE VEGETATION
3. SUPPLEMENTAL PLANTING- SEE PLANTING PLAN

0' 20' 40' 60' (VERTICAL)

0' 20' 40' 60' (HORIZONTAL)



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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY T. FISHER

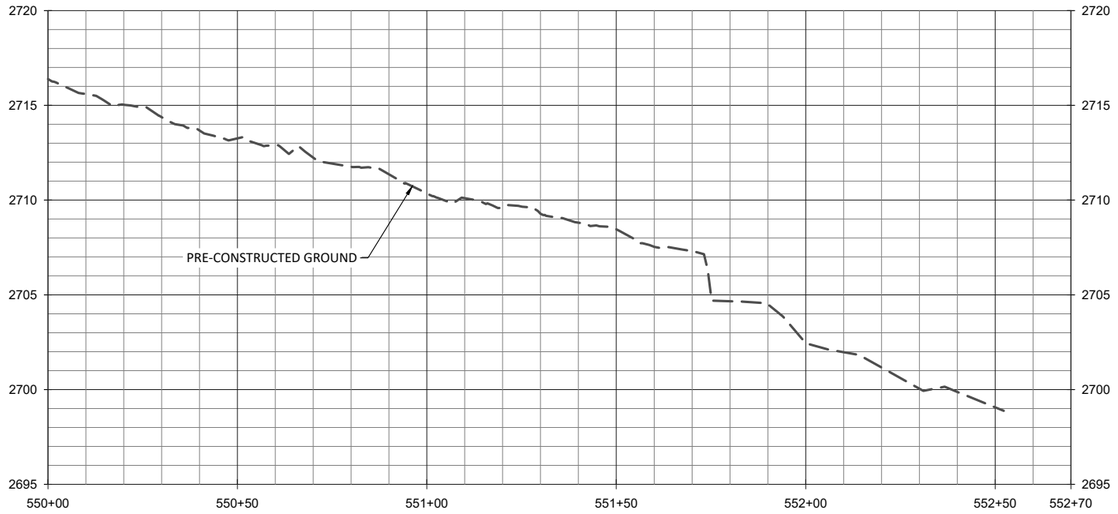
Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina
UT6 Reach 1
Stream Plan and Profile

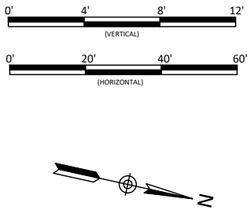
Revisions:

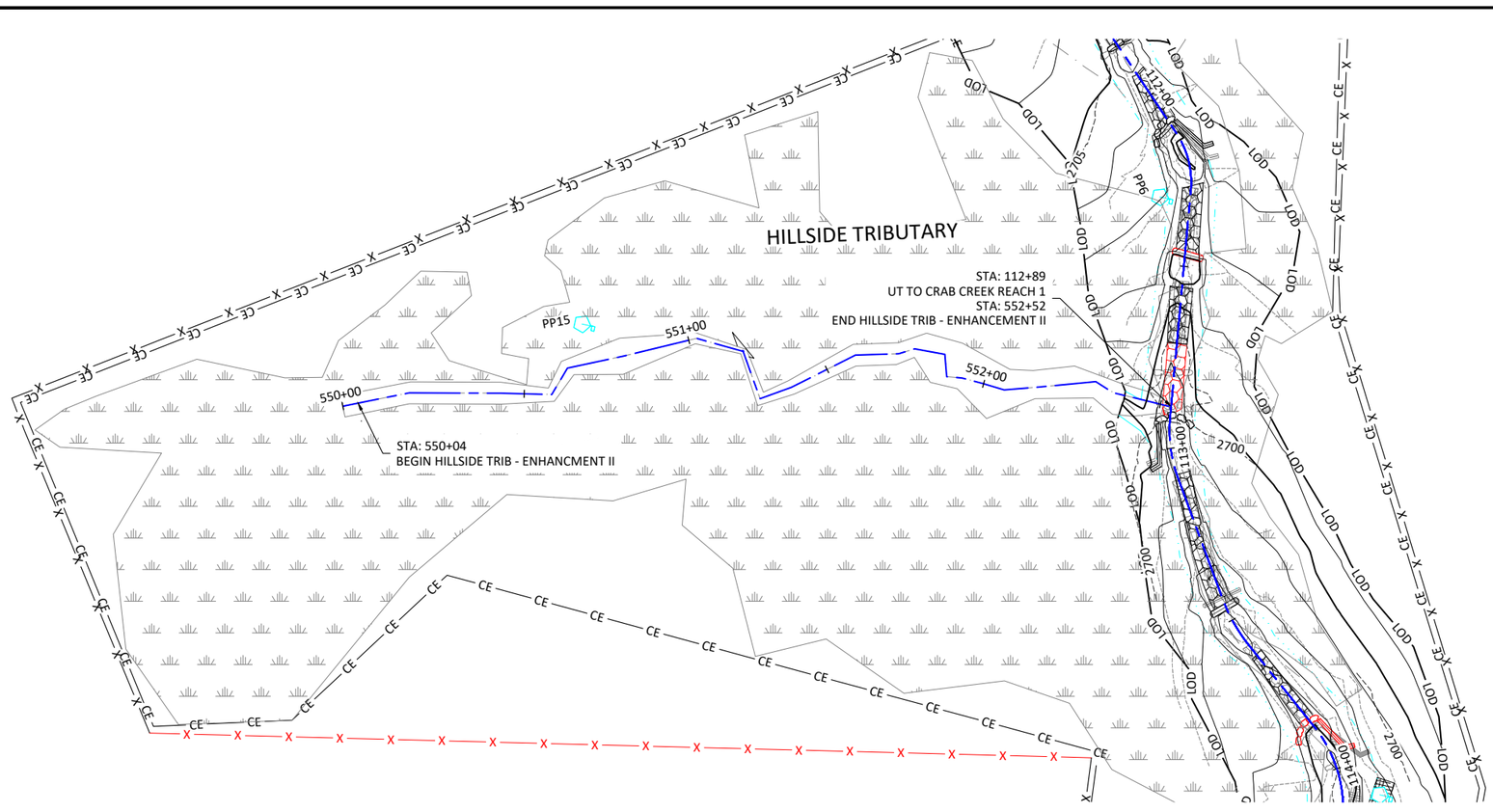
Date: March 21, 2022
Job Number: 065-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.3.2

March 21, 2022

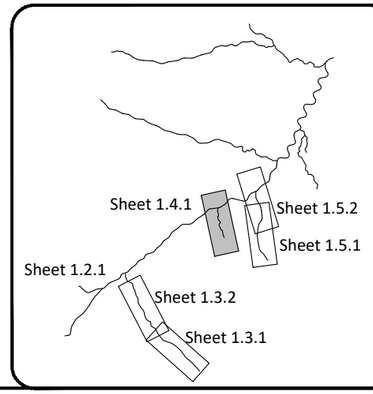






ENHANCEMENT II REACH TREATMENT:
1. EXCLUDE CATTLE
2. TREAT INVASIVE VEGETATION
3. SUPPLEMENTAL PLANTING- SEE PLANTING PLAN

Sheet Index



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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY M. KEEVER

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

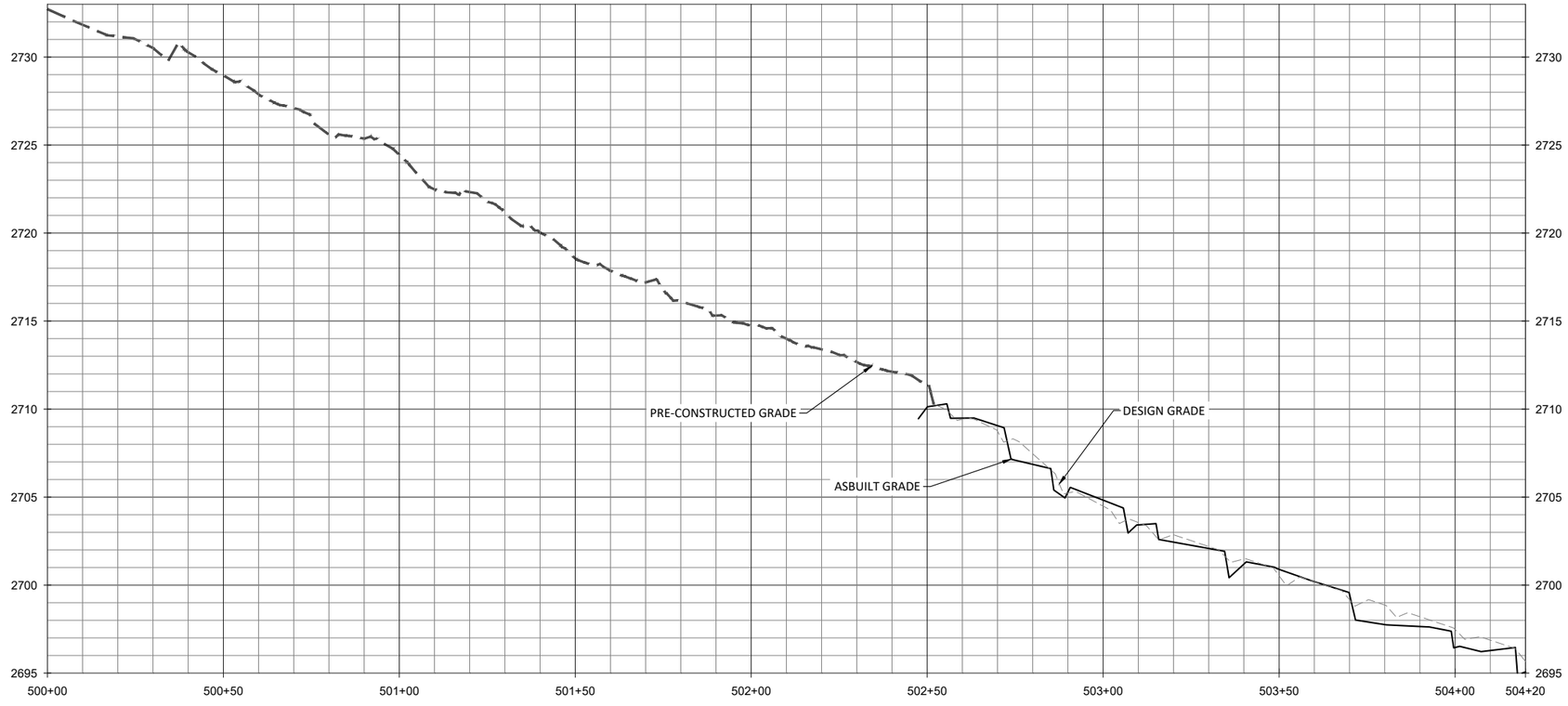
Hillside Trib Reach 1
Stream Plan and Profile

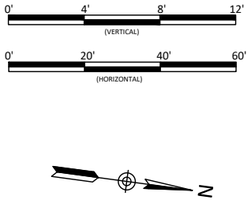
Revisions:

Date: March 21, 2022
Job Number: 095-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.4.1

March 21, 2022





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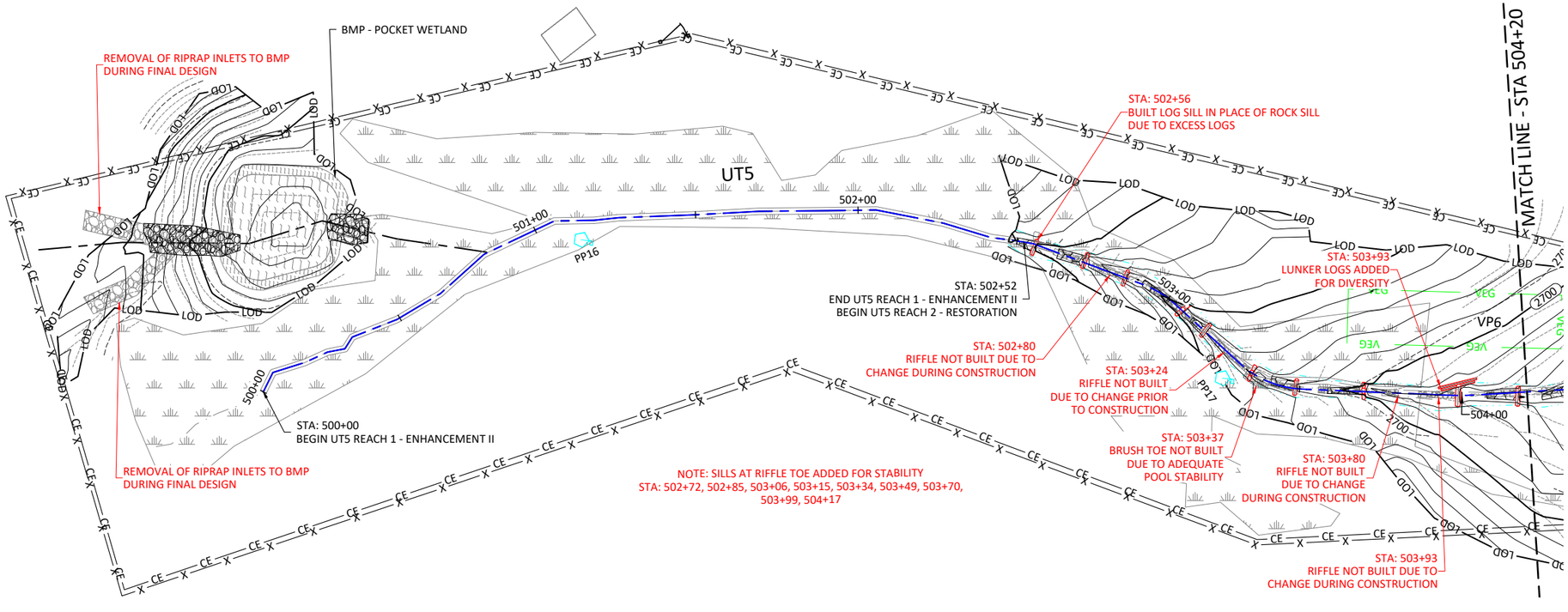
NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY T. SCHAFER

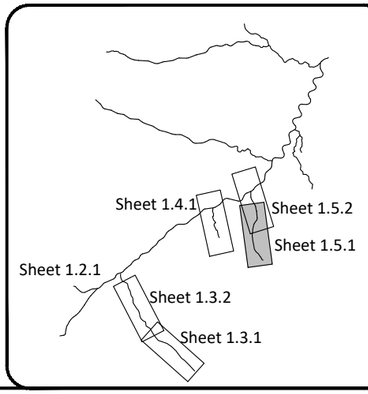
Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT5 Reach 1
Stream Plan and Profile



ENHANCEMENT II REACH TREATMENT:
1. EXCLUDE CATTLE
2. TREAT INVASIVE VEGETATION
3. SUPPLEMENTAL PLANTING- SEE PLANTING PLAN

Sheet Index



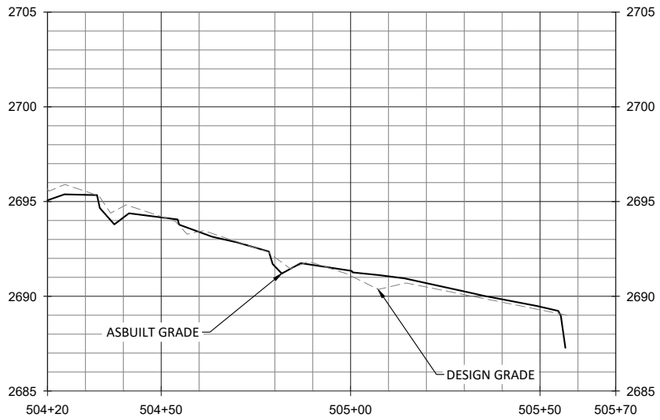
Revisions:

Date:	March 21, 2022
Job Number:	065-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Sheet 1.5.1

x:\Shared\Projects\065-02174 double h farms\monitoring\baseline monitoring\Plans\MB-02174 - Plan and Profile.dwg

March 21, 2022

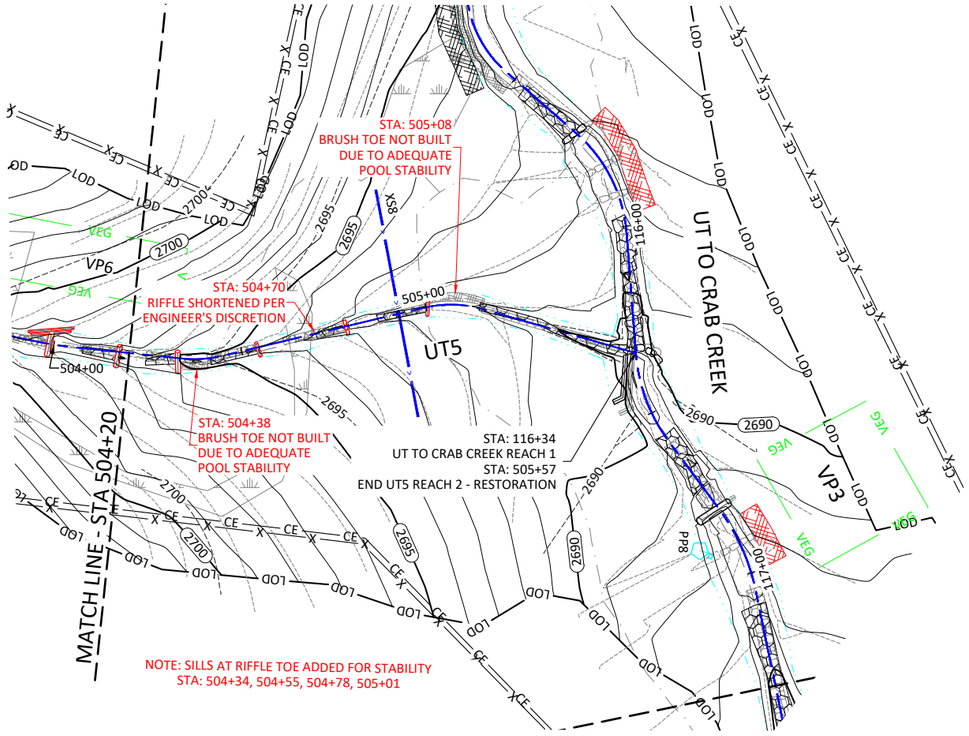


NOTE:POOLS FILLED WITH SEDIMENT AT STA: 505+07 AS
VEGETATION STABILIZES FLOODPLAIN, POOLS SHOULD CLEAR.

0' 4' 8' 12'
(VERTICAL)

0' 20' 40' 60'
(HORIZONTAL)

N



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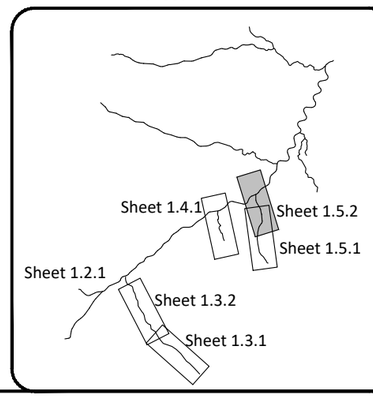

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY L. NOLEN

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

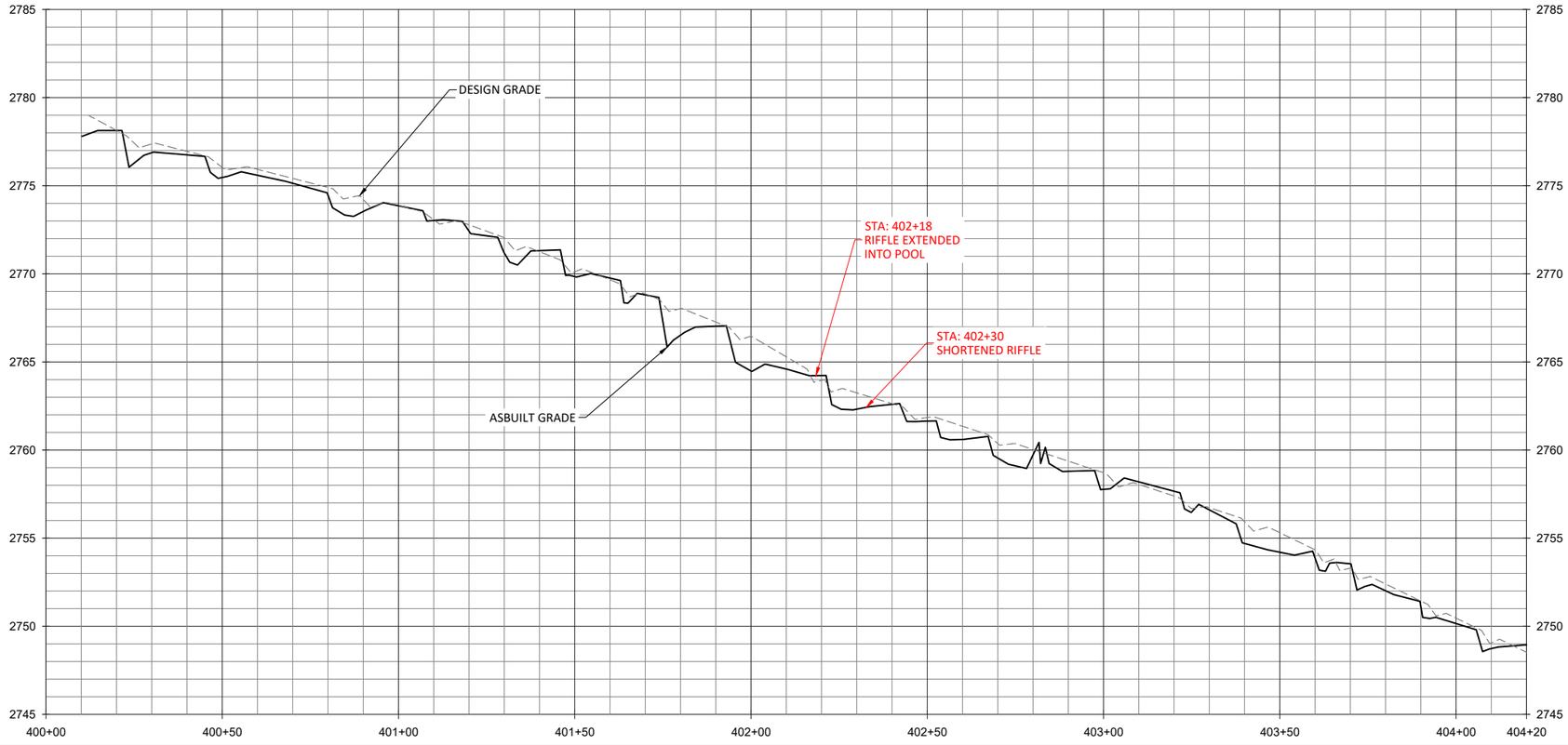
UT5 Reach 1
Stream Plan and Profile

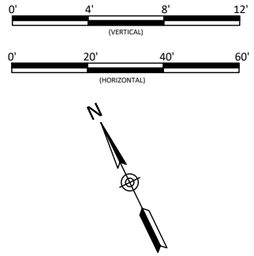
Revisions:

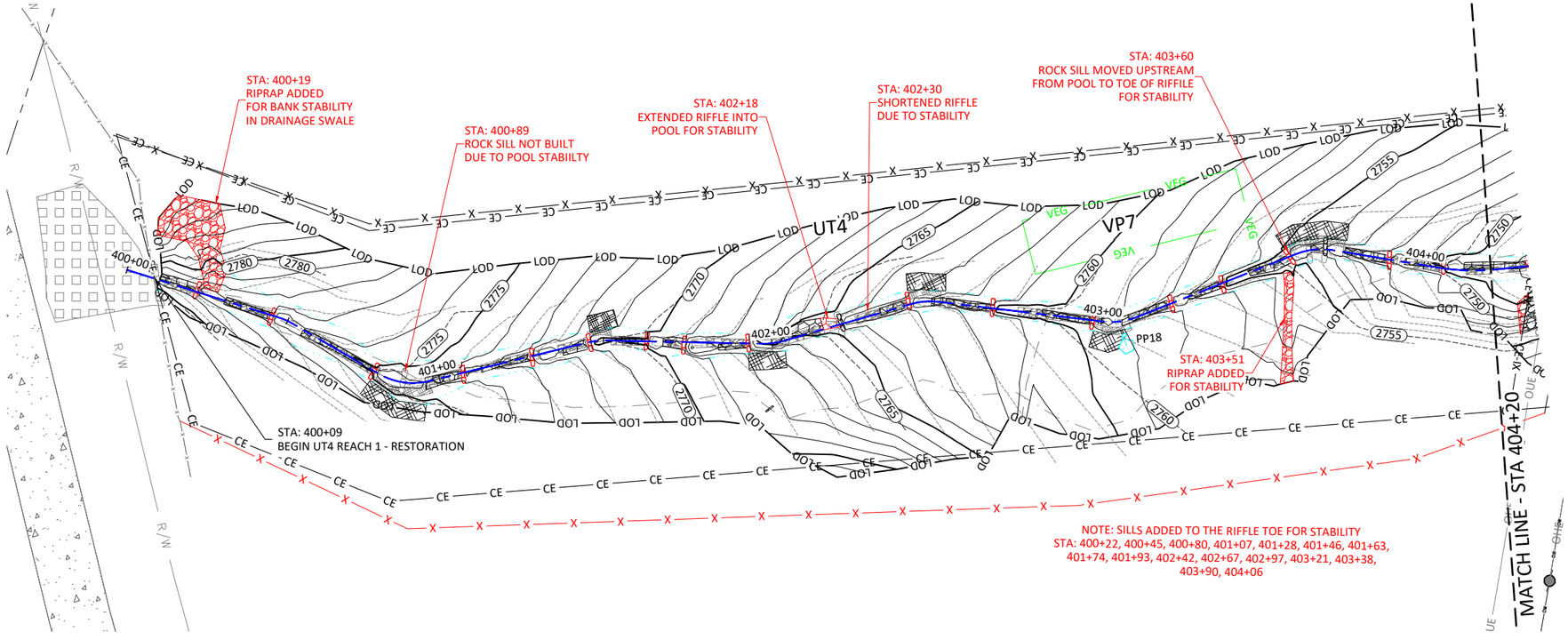
Date: March 21, 2022
Job Number: 065-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.5.2

March 21, 2022







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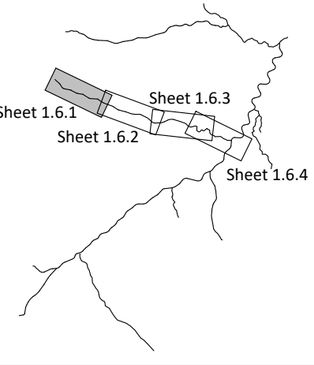

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY T. KNIGHT

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT4 Reach 1
Stream Plan and Profile

Revisions:

Date: March 21, 2022
Job Number: 005-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.6.1

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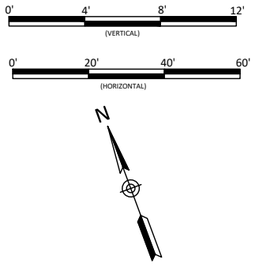
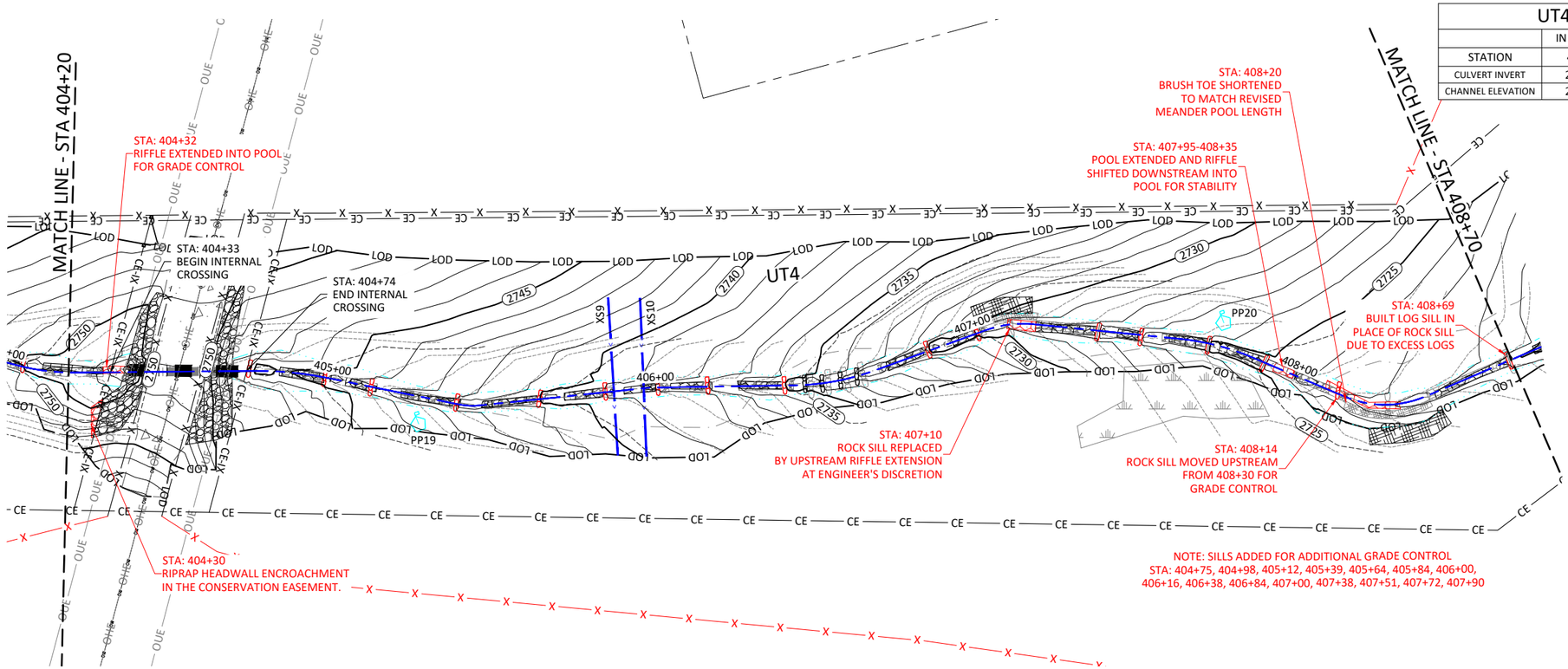
March 21, 2022

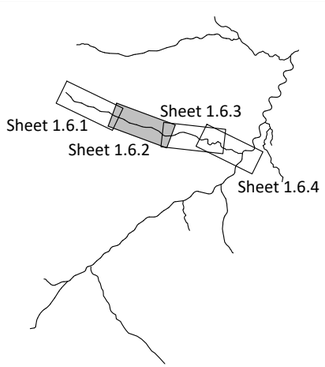


UT4 R1 (42"x29" ARCHED CMP)				
	IN (DESIGN)	IN (AS-BUILT)	OUT (DESIGN)	OUT (AS-BUILT)
STATION	404+39	404+40	404+70	404+71
CULVERT INVERT	2746.46	2746.69	2745.86	2745.91
CHANNEL ELEVATION	2746.96	2746.68	2746.36	2745.92



NOTE: SILLS ADDED FOR ADDITIONAL GRADE CONTROL
STA: 404+75, 404+98, 405+12, 405+39, 405+64, 405+84, 406+00, 406+16, 406+38, 406+84, 407+00, 407+38, 407+51, 407+72, 407+90

Sheet Index



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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY L. KEATHLEY

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

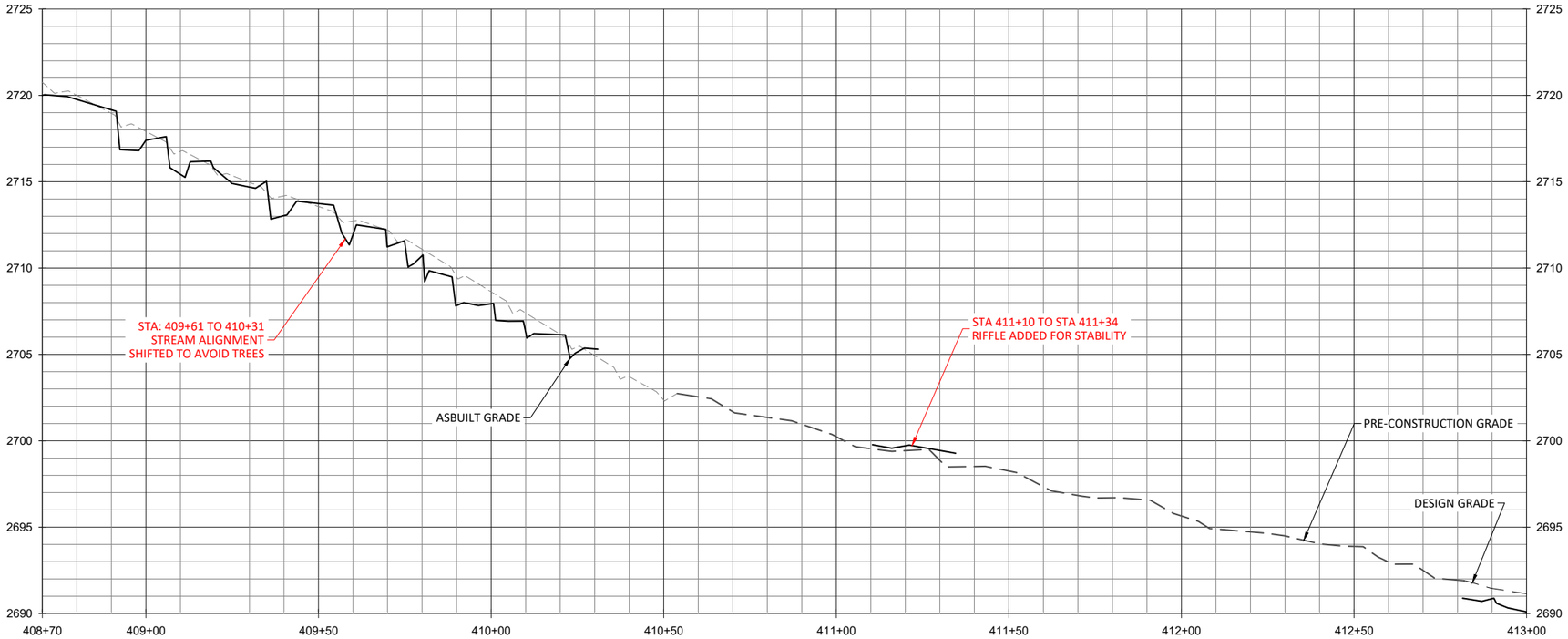
UT4 Reach 1
Stream Plan and Profile

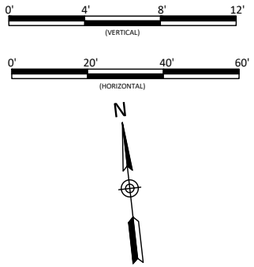
Revisions:

Date: March 21, 2022
Job Number: 095-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.6.2

March 21, 2022





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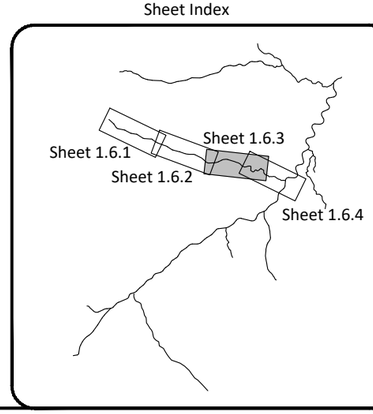

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY L. KEEVER

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT4 Reach 1 & Reach 2
Stream Plan and Profile

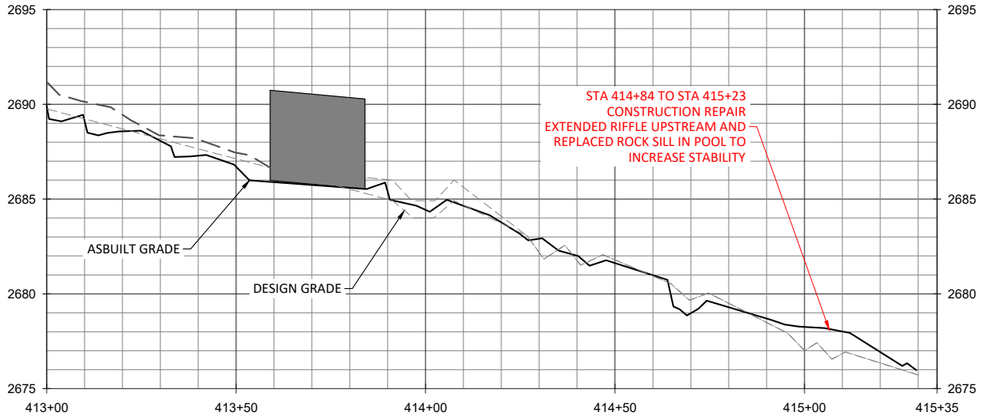
Revisions:

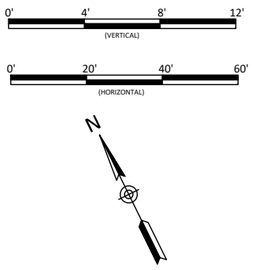
Date: March 21, 2022
Job Number: 0105-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

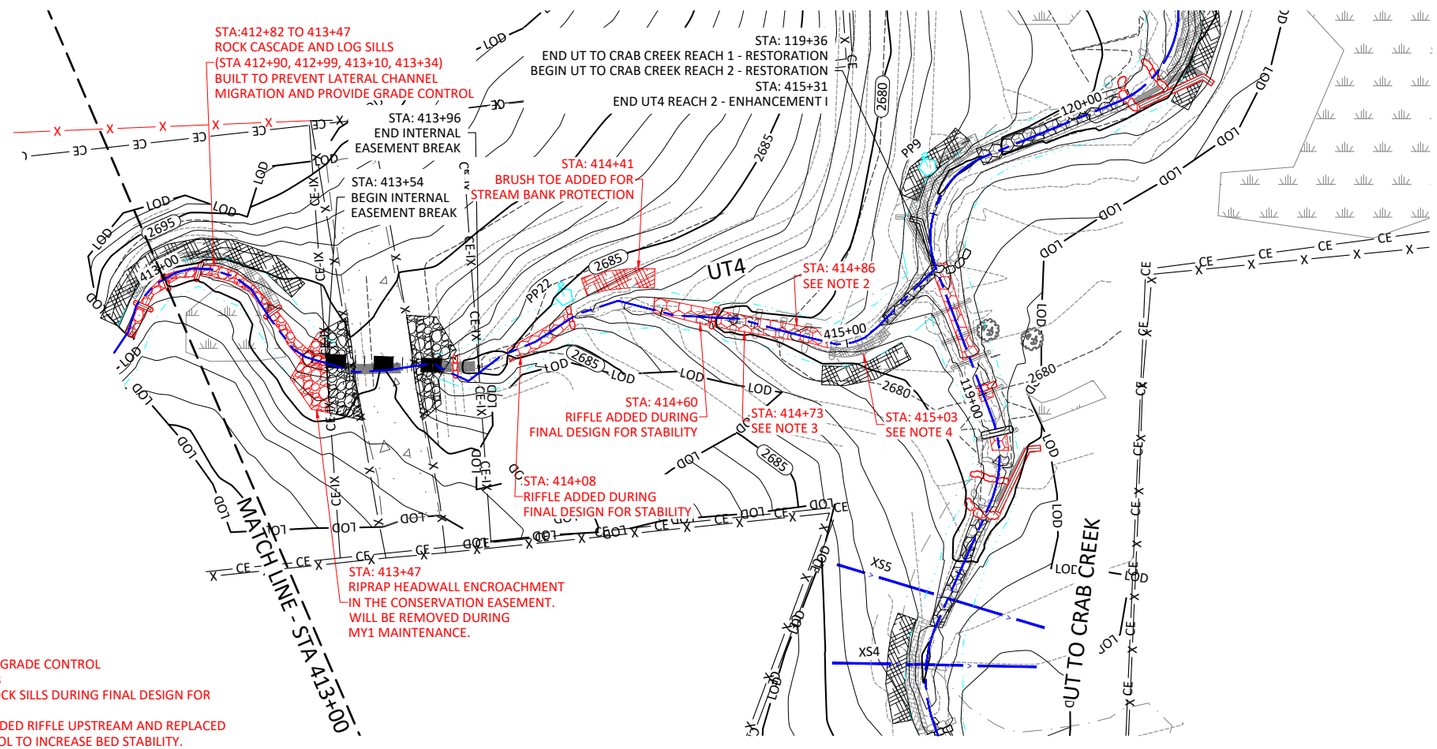
Sheet 1.6.3

x:\Shared\Projects\0105-02174 double h farms\monitoring\baseline monitoring\Plans\MB-02174 - Plan and Profile.dwg

March 21, 2022



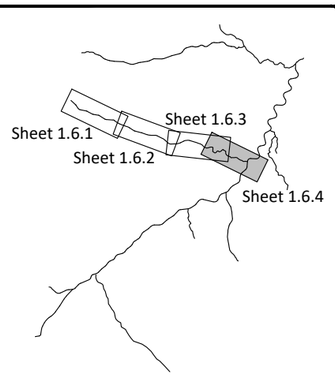




UT4 R2 (42"x29" ARCHED CMP)				
	IN (DESIGN)	IN (AS-BUILT)	OUT (DESIGN)	OUT (AS-BUILT)
STATION	413+59	413+54	413+92	413+84
CULVERT INVERT	2686.14	2685.99	2685.50	2685.53
CHANNEL ELEVATION	2686.64	2685.91	2686.00	2685.54

NOTE:
1. SILLS ADDED FOR ADDITIONAL GRADE CONTROL
   STA: 413+89, 414+25, 414+63
2. RIFFLE REPLACED SERIES OF ROCK SILLS DURING FINAL DESIGN FOR ADDITIONAL STABILITY.
3. CONSTRUCTION REPAIR EXTENDED RIFFLE UPSTREAM AND REPLACED ROCK SILL (STA: 414+69) IN POOL TO INCREASE BED STABILITY.
4. ROCK SILL IN POOL REMOVED DUE TO POOL STABILITY.

Sheet Index



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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFREY N. KEAR

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT4 Reach 2
Stream Plan and Profile

Revisions:

Date: March 21, 2022
Job Number: 095-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.6.4

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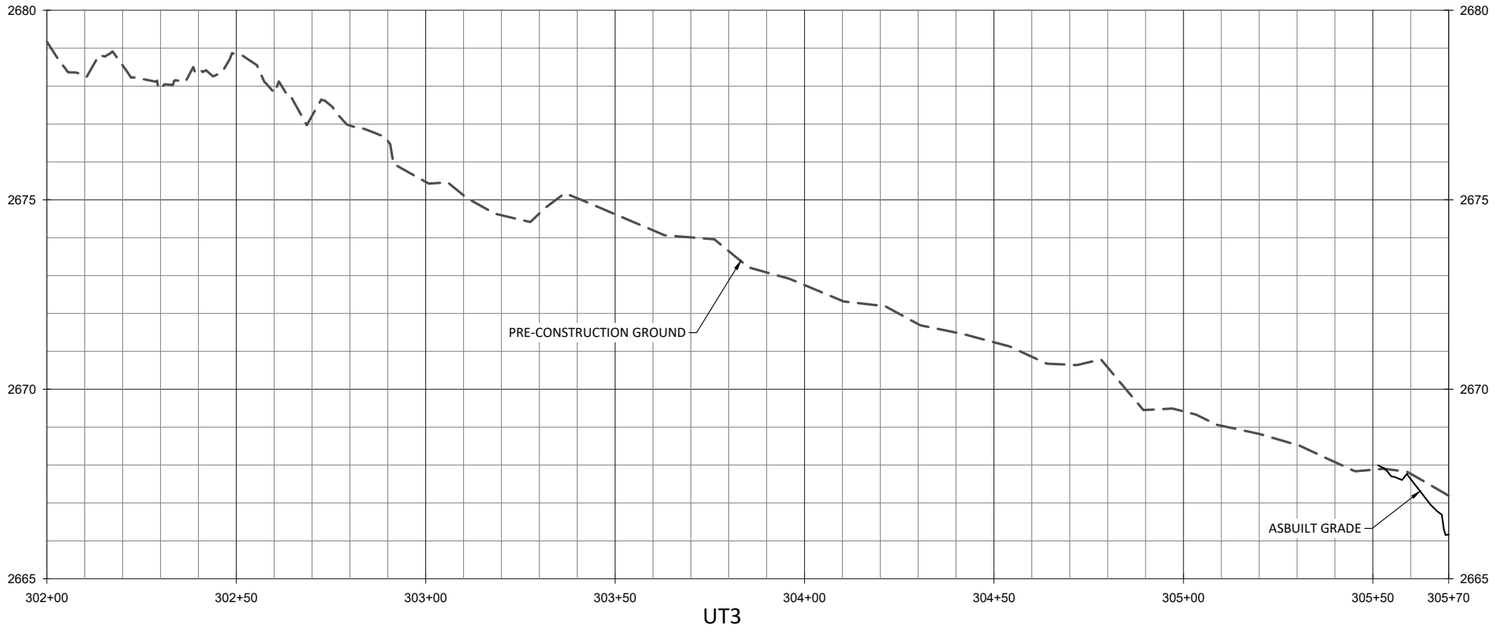
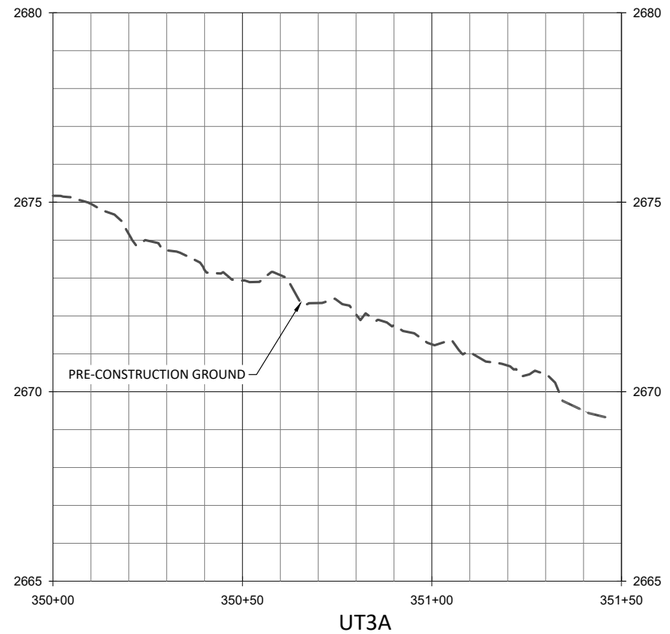
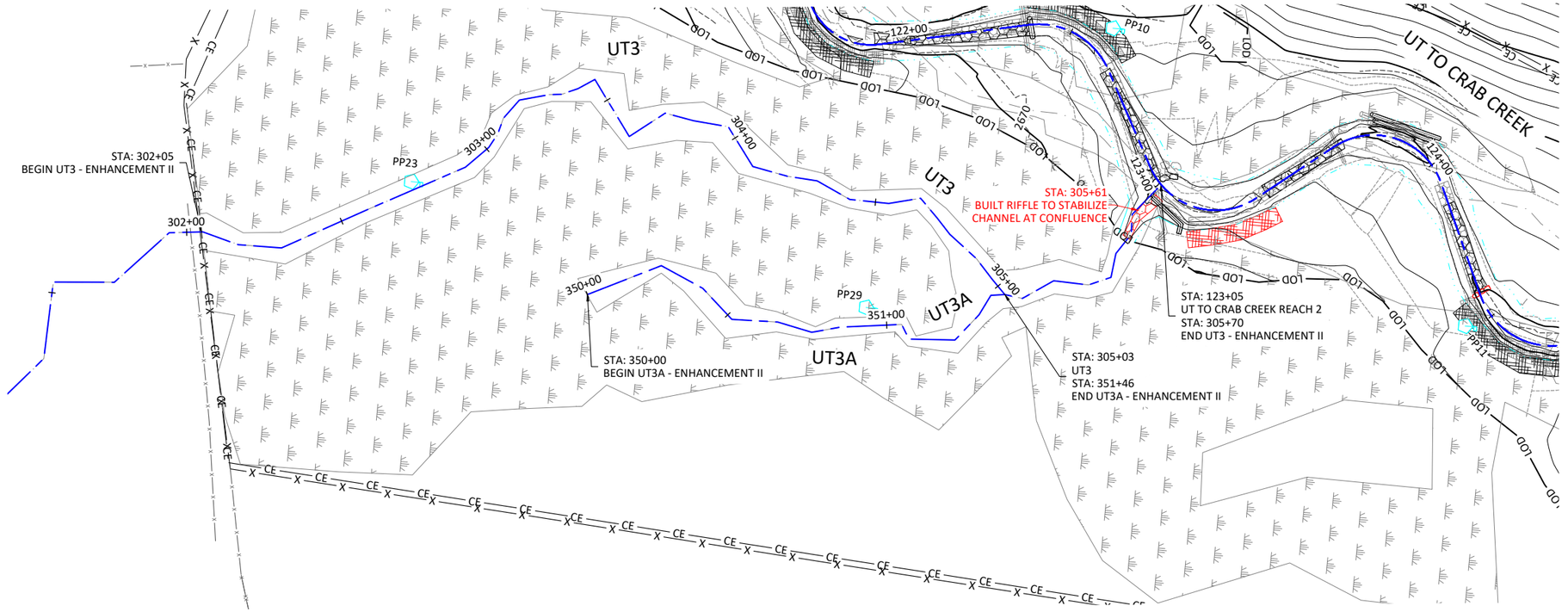
March 21, 2022

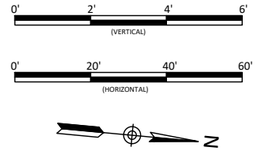


UT3



UT3A

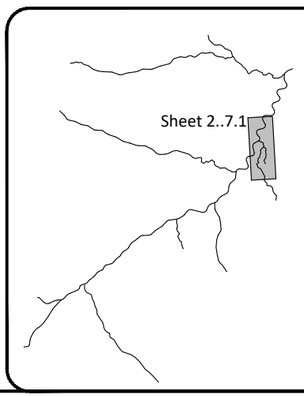




ENHANCEMENT II REACH TREATMENT:

1. EXCLUDE CATTLE
2. TREAT INVASIVE VEGETATION
3. SUPPLEMENTAL PLANTING- SEE PLANTING PLAN

Sheet Index



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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY L. KEAFORD

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT3 & UT3A
Stream Plan and Profile

Revisions:

Date: March 21, 2022
Job Number: 005-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.7.1

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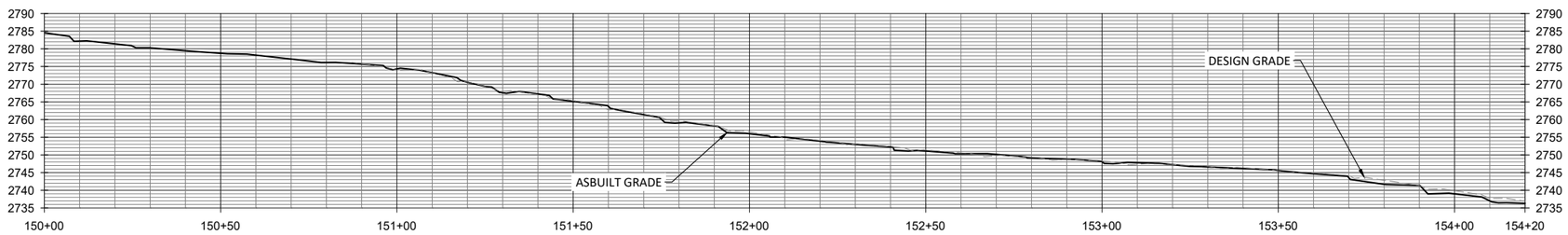
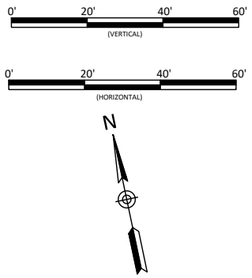
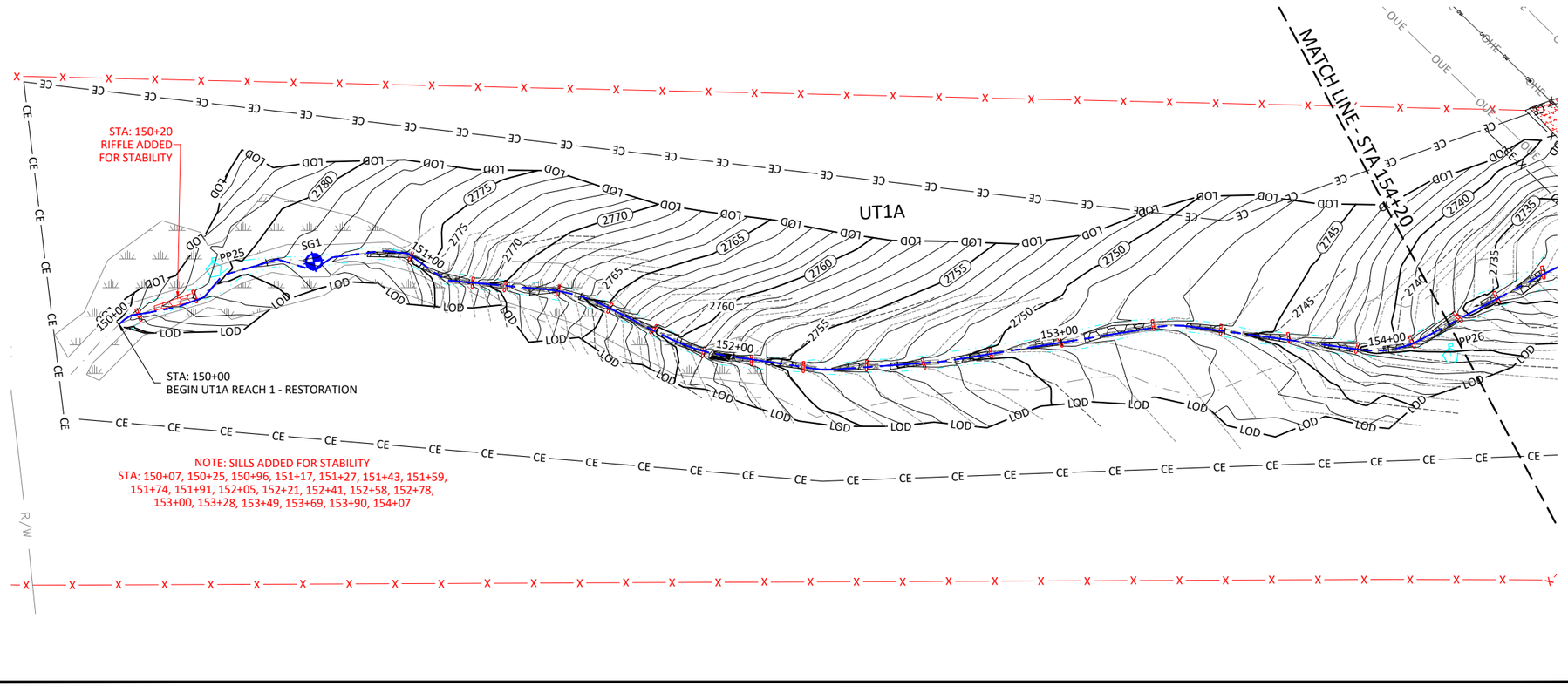
March 21, 2022







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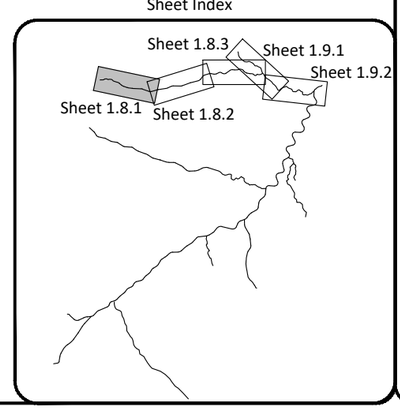

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFREY T. KNOTT

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT1A Reach 1
Stream Plan and Profile

Revisions:

Date: March 21, 2022
Job Number: 095-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.8.1

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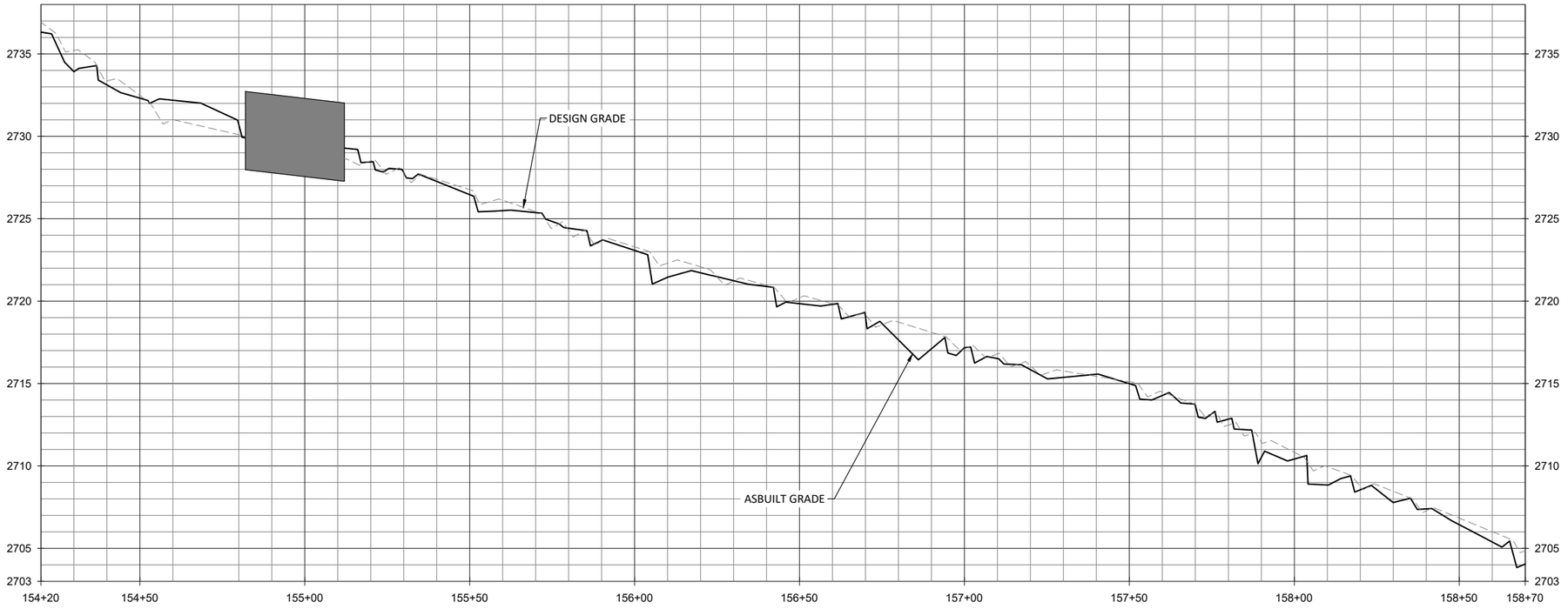
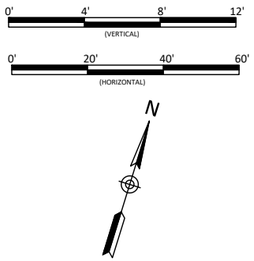
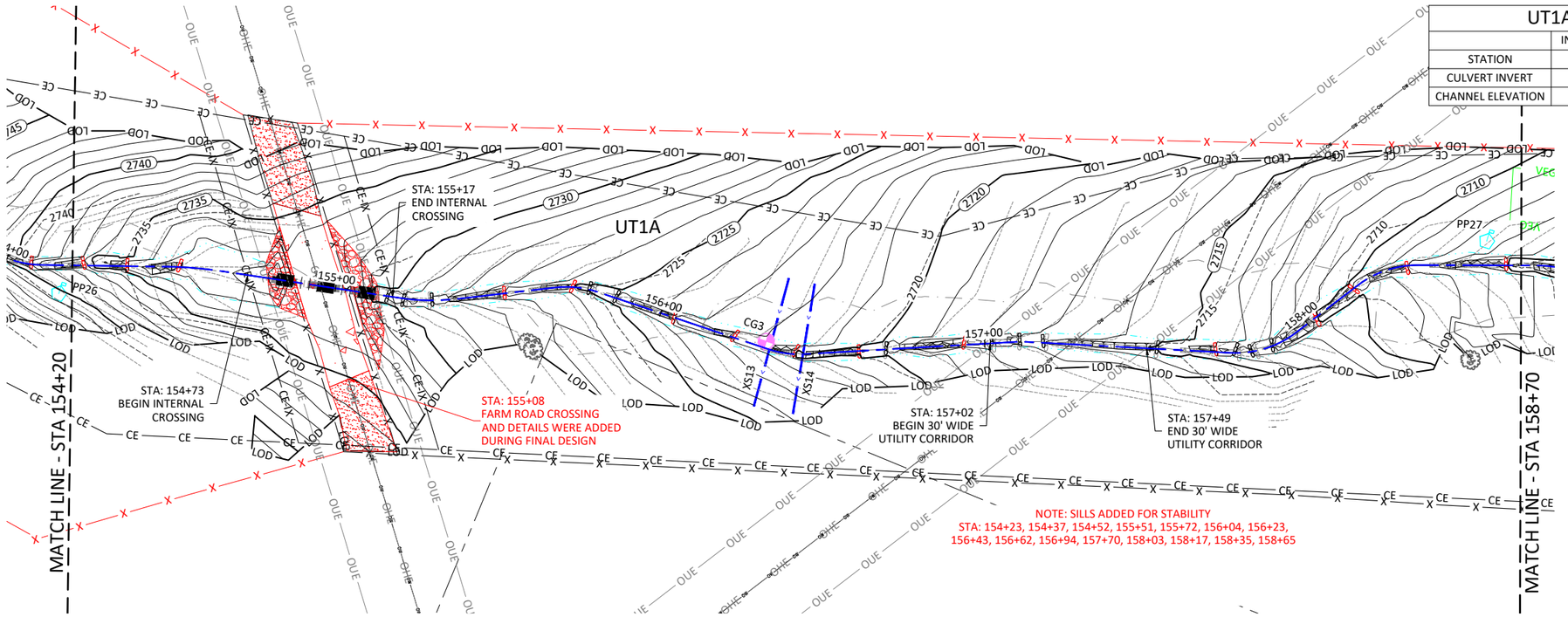
March 21, 2022





UT1A R1 (42"x29" ARCHED CMP)				
	IN (DESIGN)	IN (AS-BUILT)	OUT (DESIGN)	OUT (AS-BUILT)
STATION	154+80	154+82	155+13	155+12
CULVERT INVERT	2729.60	2729.97	2728.94	2729.27
CHANNEL ELEVATION	2730.10	2729.91	2729.44	2729.28



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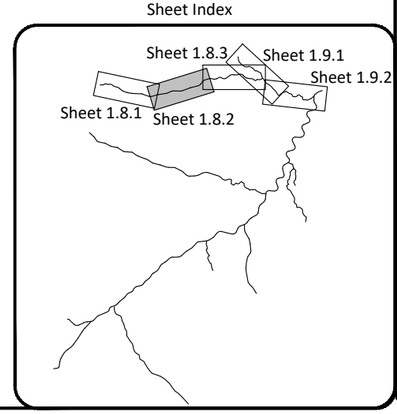

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Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

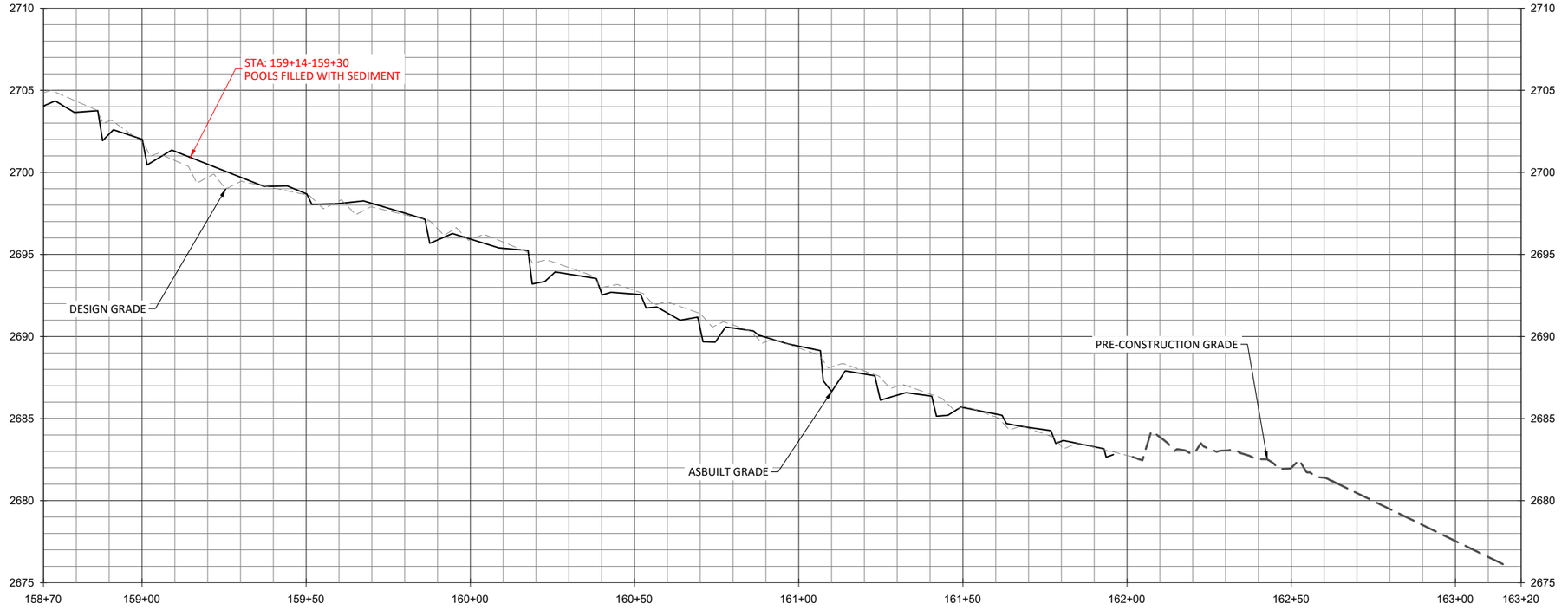
UT1A Reach 1
Stream Plan and Profile

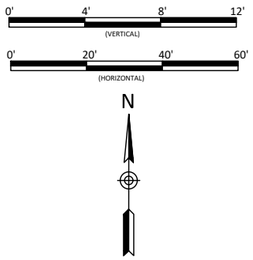
Revisions:

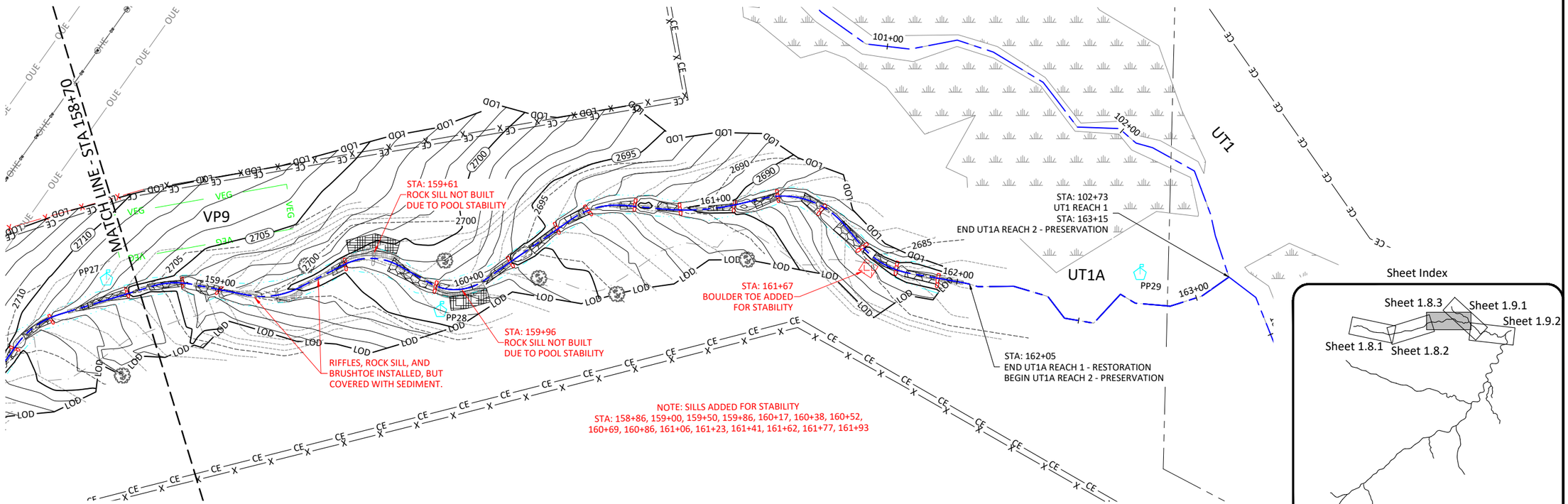
Date: March 21, 2022
Job Number: 0105-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.8.2

March 21, 2022







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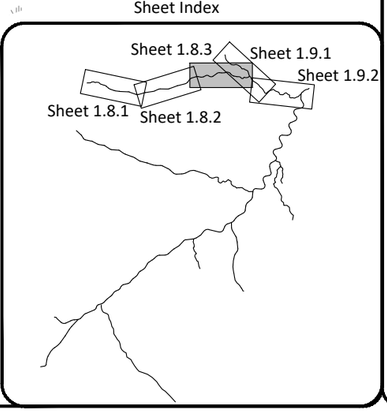

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Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

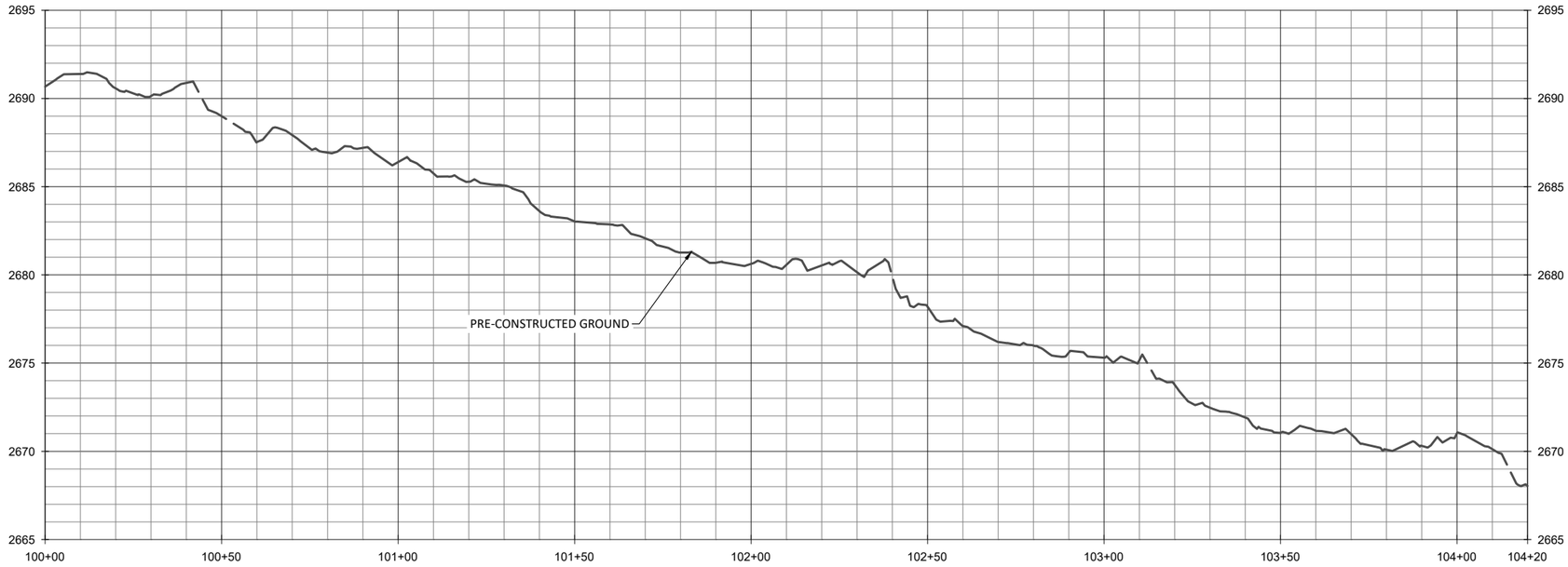
UT1A Reach 1 & Reach 2
Stream Plan and Profile

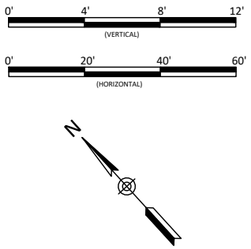
Revisions:

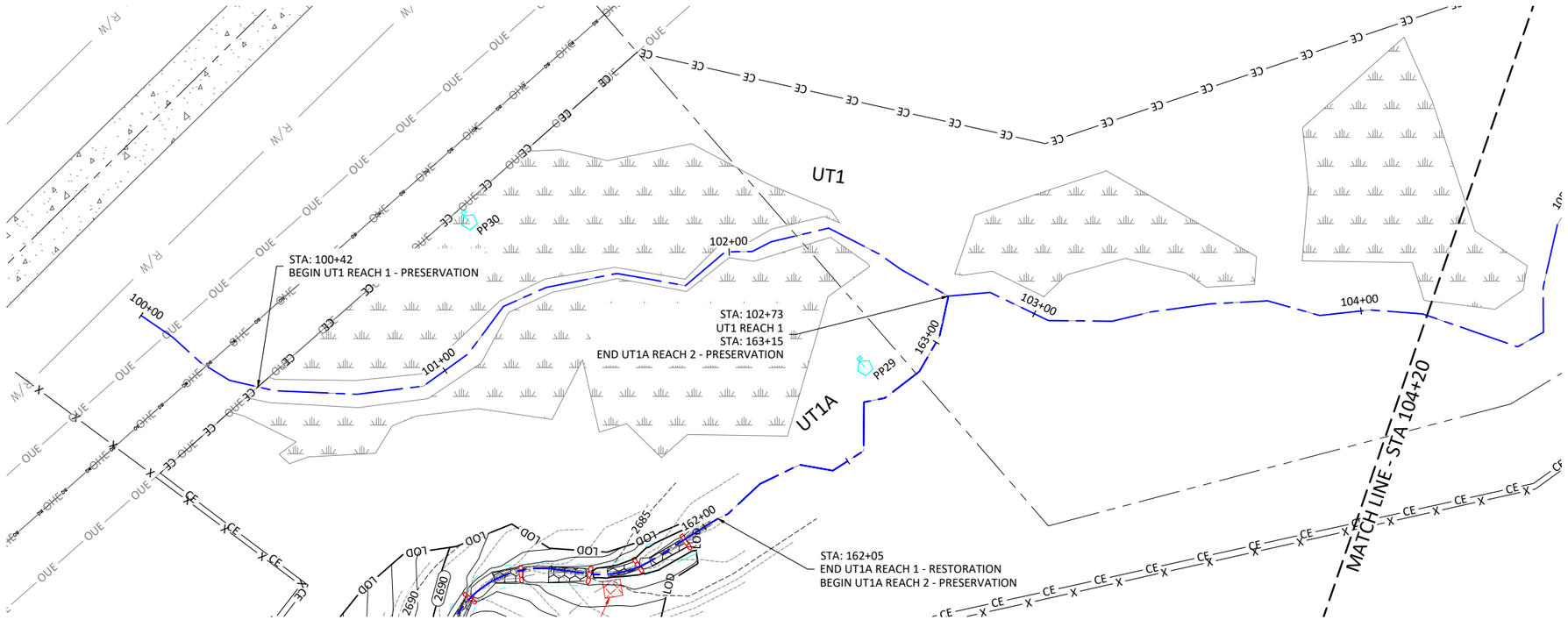
Date: March 21, 2022
Job Number: 005-02174
Project Engineer: TNK
Drawn By: AMR
Checked By: JCK

Sheet 1.8.3

March 21, 2022







PRESERVATION REACH TREATMENT:
1. TREAT INVASIVE VEGETATION

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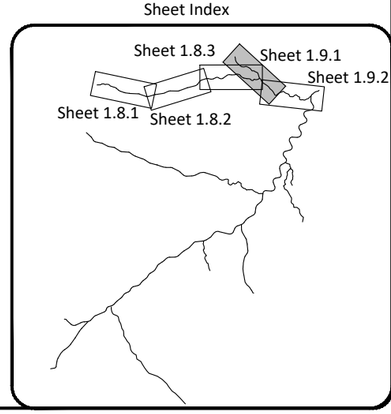

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Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

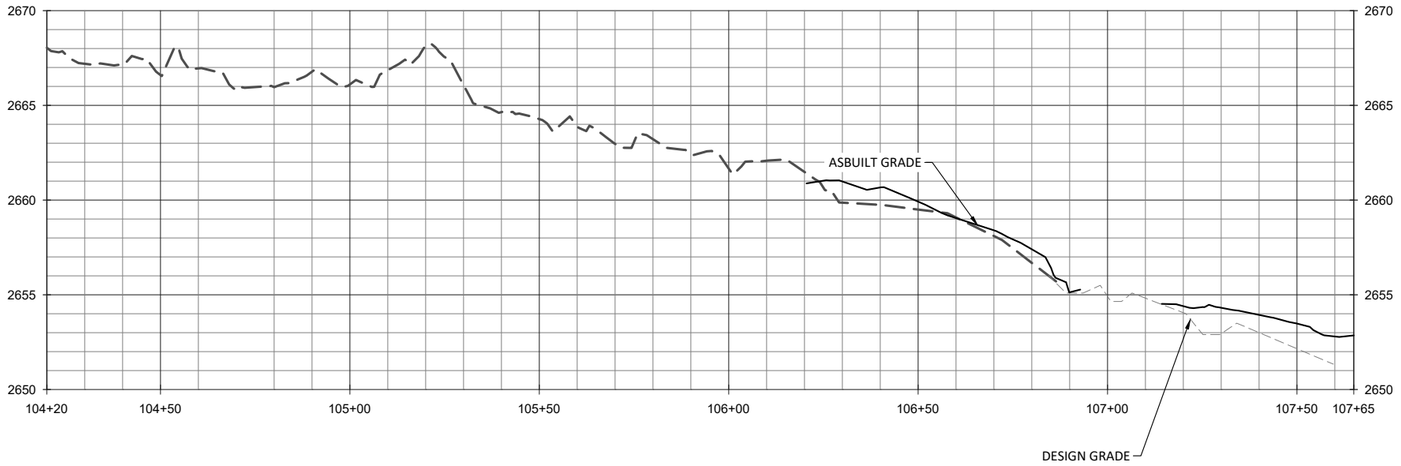
UT1 Reach 1
Stream Plan and Profile

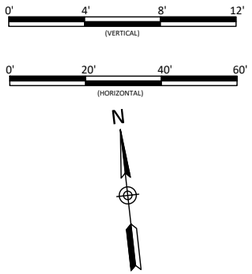
Revisions:

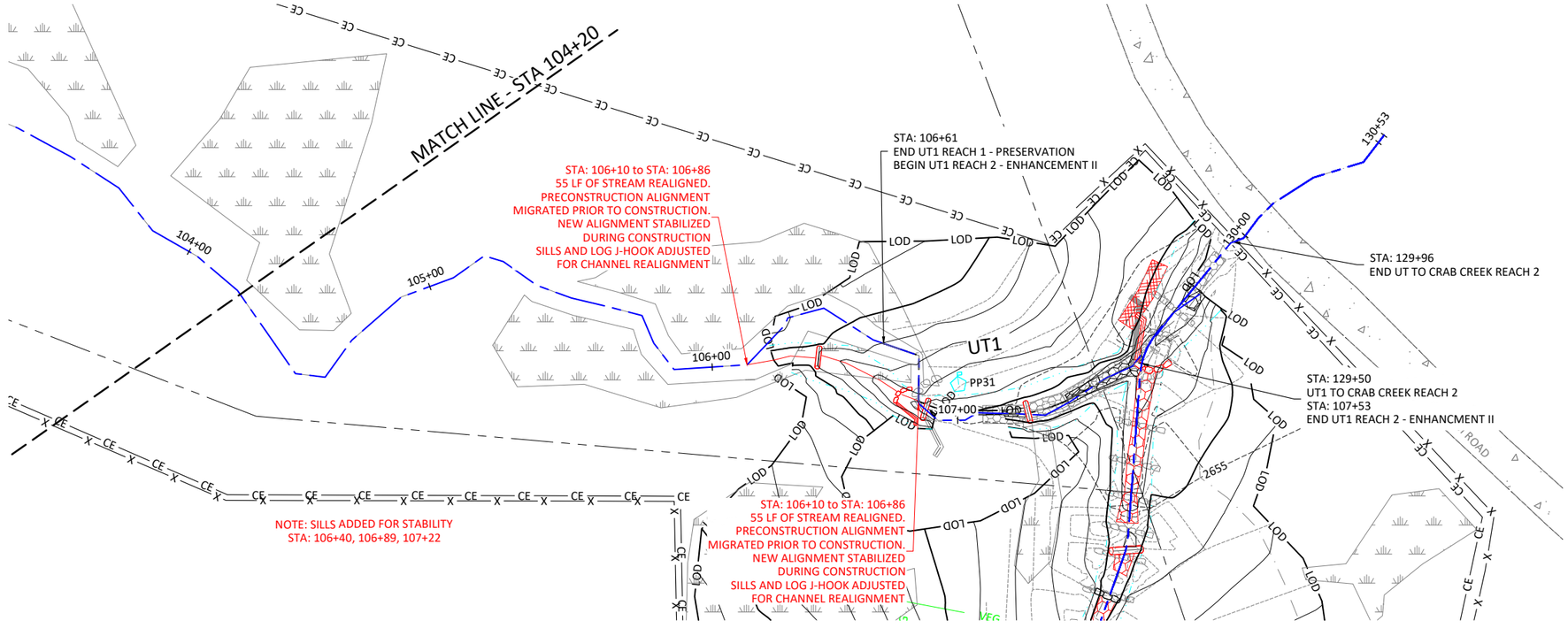
Date: March 21, 2022
Job Number: 095-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 1.9.1

March 21, 2022



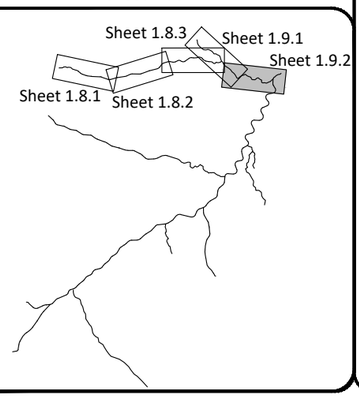




PRESERVATION REACH TREATMENT:
1. TREAT INVASIVE VEGETATION

ENHANCEMENT II TREATMENT:
1. TREAT INVASIVE VEGETATION
2. SUPPLEMENTAL PLANTING - SEE PLANTING PLANS
3. GRADE FLOODPLAIN BENCH
4. ADD IN-STREAM STRUCTURES

Sheet Index



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Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

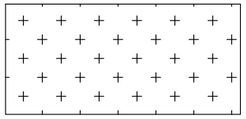
UT1 Reach 1 & Reach 2
Stream Plan and Profile

Revisions:

Date: March 21, 2022
Job Number: 005-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

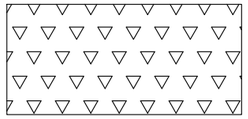
Sheet: 1.9.2

March 21, 2022



Total Planting Area: 14.0 ac

Riparian Planting Zone							
Species	**Common Name**	**Max Spacing**	**Indiv. Spacing**	**Min. Caliper**	**Stratum**	**Percentage**	**Wetland Indicator Code**
Platanus occidentalis	Sycamore	12	6-12	0.25"	Canopy	15%	FACW
Diospyros virginiana	Persimmon	12	6-12	0.25"	Canopy	10%	FAC
Ostrya virginiana	Ironwood	12	6-12	0.25"	Canopy	5%	FAC
~~*Betula lenta*~~	~~Sweet birch~~	~~12~~	~~6-12~~	~~0.25"~~	~~Canopy~~	~~10%~~	~~FACU~~
*Oxydendrum arboreum**	Sourwood	12	6-12	0.25"	Subcanopy	5%	UPL
~~*Magnolia acuminata*~~	~~Cucumber Magnolia~~	~~12~~	~~6-12~~	~~0.25"~~	~~Canopy~~	~~10%~~	~~FACU~~
Quercus rubra	Northern Red Oak	12	6-12	0.25"	Canopy	10%	FACU
*Asimina triloba**	Pawpaw*	12	6-12	0.25"	Subcanopy	5%	FAC
Euonymus americanus	Srawberrybush*	12	6-12	0.25"	Subcanopy	5%	FAC
Prunus serotina	Black Cherry	12	6-12	0.25"	Canopy	10%	FACU
Liriodendron tulipifera	Tulip Poplar	12	6-12	0.25"	Canopy	5%	FACU
Quercus alba	White Oak	12	6-12	0.25"	Canopy	10%	UPL
Morus rubra	Red Mulberry	12	6-12	0.25"	Canopy	10%	FACU
Aescucus sylvatica	Yellow Buckeye	12	6-12	0.25"	Canopy	10%	FAC
					Total	100%	



Total Planting Area: 2.6 ac

*not subject to monitoring requirements

Wetland Planting Zone							
Species	**Common Name**	**Max Spacing**	**Indiv. Spacing**	**Min. Caliper**	**Stratum**	**Percentage**	**Wetland Indicator Code**
Bare Roots							
Platanus occidentalis	Sycamore	12	6-12	0.25"	Canopy	20%	FACW
Betula nigra	River Birch	12	6-12	0.25"	Canopy	**10%**	FACW
*Salix sericea^*	Silky Willow	12	6-12	0.5"	Shrub	10%	OBL
Acer negundo	Boxelder	12	6-12	0.25"	Canopy	10%	FAC
*Alnus serrulata**	Tag Alder	12	6-12	0.25"	Shrub	**10%**	OBL
*Euonymus americana**	Strawberrybush*	12	6-12	0.25"	Shrub	5%	FAC
Lindera benzoin	**Spicebush***	**12**	**6-12**	**0.25"**	**Shrub**	**5%**	**FAC**
Sambucus canadensis	**Elderberry***	**12**	**6-12**	**0.25"**	**Shrub**	**5%**	**FACW**
*Physocarpus opulifolius**	Common Ninebark	12	6-12	0.25"	Shrub	5%	FACW
Carpinus caroliniana	American Hornbeam	12	6-12	0.25"	Subcanopy	5%	FAC
*Salix nigra^*	Black Willow	12	6-12	0.5"	Shrub	15%	OBL
					Total	100%	
**not subject to monitoring requirements*							
^species will be planted as live stakes							
Herbaceous Plugs							
Juncus effusus	Soft Rush	8	4-8	2.0" plug	Herb	12%	FACW
Carex lurida	Shallow Sedge	8	4-8	2.0" plug	Herb	12%	OBL
Carex crinita	Fringed Sedge	8	4-8	2.0" plug	Herb	10%	OBL
Scirpus cyperinus	Woolgrass	8	4-8	2.0" plug	Herb	8%	OBL
Carex vulpinoidea	Fox Sedge	8	4-8	2.0" plug	Herb	11%	OBL
Chelone glabra	Turtlehead	8	4-8	2.0" plug	Herb	8%	OBL
Eutrochium fistulosum	Trumpetweed	8	4-8	2.0" plug	Herb	10%	FACW
Eupatorium perfoliatum	Boneset	8	4-8	2.0" plug	Herb	8%	FACW
Peltandra virginica	Green Arrow-arum	8	4-8	2.0" plug	Herb	10%	OBL
Carex scoparia	Broom Sedge	8	4-8	2.0" plug	Herb	11%	FACW
					Total	100%	

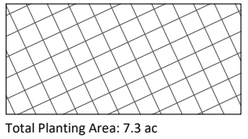
*not subject to monitoring requirements

Streambank Planting Zone							
Live Stakes: >8' TOB							
Species	**Common Name**	**Max Spacing**	**Indiv. Spacning**	**Min. Size**	**Stratum**	**Percentage**	**Wetland Indicator Code**
Salix sericea	Silky Willow	6	3-6	0.5" cal.	Shrub	25%	OBL
Cornus amomum	Silky Dogwood	6	3-6	0.5" cal.	Shrub	25%	FACW
Sambucus canadensis	Common Elderberry	6	3-6	0.5" cal.	Shrub	15%	FACW
Salix nigra	Black Willow	6	3-6	0.5" cal.	Shrub	35%	OBL
					Total	100%	
Live Stakes: <8' TOB							
Salix sericea	Silky Willow	6	3-6	0.5" cal.	Shrub	30%	OBL
Cornus amomum	Silky Dogwood	6	3-6	0.5" cal.	Shrub	30%	FACW
Sambucus canadensis	Common Elderberry	6	3-6	0.5" cal.	Shrub	30%	FACW
Physocarpos opulifolius	Ninebark	6	3-6	0.5" cal.	Shrub	10%	FACW
					Total	100%	
Herbaceous Plugs							
Juncus effusus	Common Rush	4	3-4	2.0" plug	Herb	40%	FACW
Carex lurida	Shallow Sedge	4	3-4	2.0" plug	Herb	25%	OBL
Carex crinita	Fringed Sedge	4	3-4	2.0" plug	Herb	20%	OBL
Cyperus strigosus	Straw-colored Flatsedge	4	3-4	2.0" plug	Herb	15%	FACW
					Total	100%	

*not subject to monitoring requirements

Permanent Riparian Seeding					
Pure Live Seed					
Approved Date	**Species Name**	**Common Name**	**Stratum**	**Density (lbs/acre)**	**Wetland Indicator Code**
All Year	*Schizachyrium scoparium*	Little Bluestem	Herb	1.5	FACU
All Year	*Panicum anceps*	Beaked Panicgrass	Herb	1.3	FAC
All Year	*Sorghastrum nutans*	Indiangrass	Herb	1.5	FACU
All Year	*Panicum dichotomum*	Forked Witchgrass	Herb	1.0	FAC
All Year	*Panicum clandestinum*	Deertongue	Herb	3.0	FAC
All Year	*Elymus virginicus*	Virginia Wild Rye	Herb	3.0	FACW
All Year	*Tripsacum dactyloides*	Eastern Gammagrass	Herb	1.0	FACW
All Year	*Juncus tenuis*	Path Rush	Herb	1.0	FAC
All Year	*Juncus effusus*	Soft Rush	Herb	0.4	FACW
All Year	*Carex vulpinoidea*	Fox Sedge	Herb	1.1	OBL
All Year	*Coreopsis lanceolata*	Lanceleaf Coreopsis	Herb	1.0	FACU
All Year	*Bidens aristosa*	Bur-Marigold	Herb	1.0	FACW
All Year	*Rudbeckia hirta*	Blackeyed Susan	Herb	1.2	FACU
All Year	*Chamaecrista fasciculata var. fasciculata*	Partridge Pea	Herb	1.0	FACU
All Year	*Achillea millefolium*	Common Yarrow	Herb	1.0	FACU

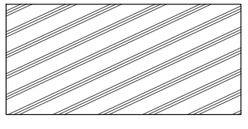
Temporary Seeding		
Approved Date	**Type**	**Planting Rate (lbs/acre)**
Jan 1 - May 1	Winter Oats (Avena Sativa)	55
	Rye Grain (Secale cereale)	120
	Ladino Clover (Trifolium repens)	5
	Medium Red Clover (Trillium pretense)	5
	SoluCal Humic Plus	200
	Neem Seed Meal	200
	Fertoz 0-20-0	200
	Straw Mulch	4000
May 1 - Aug 15	German Millet (Setaria italica)	40
	Buckwheat (Fagopyrum esculentum)	40
	SoluCal Humic Plus	200
	Fertoz 0-20-0	200
	Neem Seed Meal	200
	Straw Mulch	4000
Aug 15 - Dec 30	Winter Oats (Avena Sativa)	55
	Medium Red Clover (Trillium pretense)	5
	Ladino Clover (Trifolium repens)	5
	Neem Seed Meal	200
	SoluCal Humic Plus	200
	Fertoz 0-20-0	200
	Straw Mulch	4000



Total Planting Area: 7.3 ac

Pasture Seeding		
Pure Live Seeding (50 lbs/acre)		
Species Name	**Common Name**	**Density (lbs/acre)**
Dactylis glomerata	Orchard Grass	40
Trifolium pratense	Meduim Red Clover	5
Trifolium repens	White Ladino Cover	5

NOTE:
1. To be planted on all disturbed areas outside CE and within internal CE breaks.



No Planting Zone

NOTE:
1. No planting in wetland C and F.
2. No planting past top of bank offsets (30' for UT to Crab Creek and 15' for all other Tribs) in wetland AA, W, V, R, P and N, as shown in the plans.

WILDLANDS ENGINEERING
1430 S. Mint Street, Ste 104
Charlotte, NC 28203
Tel: 704.332.7754
Fax: 704.332.3306
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JENNIFER K. PETERSON NOVEMBER

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina
Planting Lists
Planting

Revisions:

Date: March 21, 2022
Job Number: 005-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 2.0

March 21, 2022

Sheet Index

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Fax: 704.332.3306
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. KING

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UTCC Reach 1
Planting

Revisions:

Date: March 21, 2022
Job Number: 005-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 2.1

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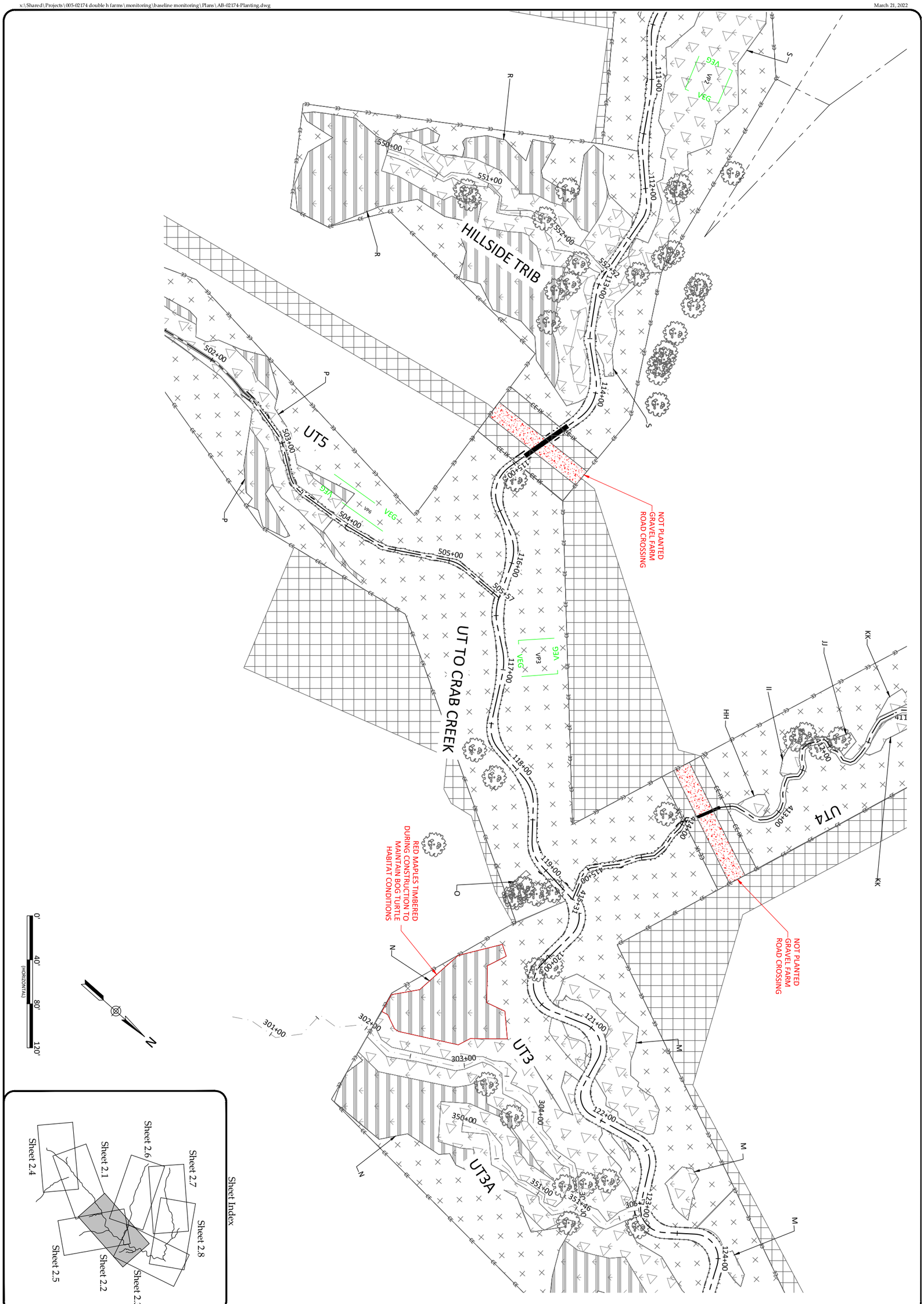

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Date:	March 21, 2022
Job Number:	005-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Revisions:

2.2
Sheet

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UTCC Reach 1 & Reach 2
Planting

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. KEATON

WILDLANDS ENGINEERING
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Firm License No. F-0831

March 21, 2022

Sheet Index

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. KLEIN NOT VALID WITHOUT ORIGINAL SIGNATURE

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina
UTCC Reach 2 Planting

Revisions:

Date:	March 21, 2022
Job Number:	005-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Sheet 2.3

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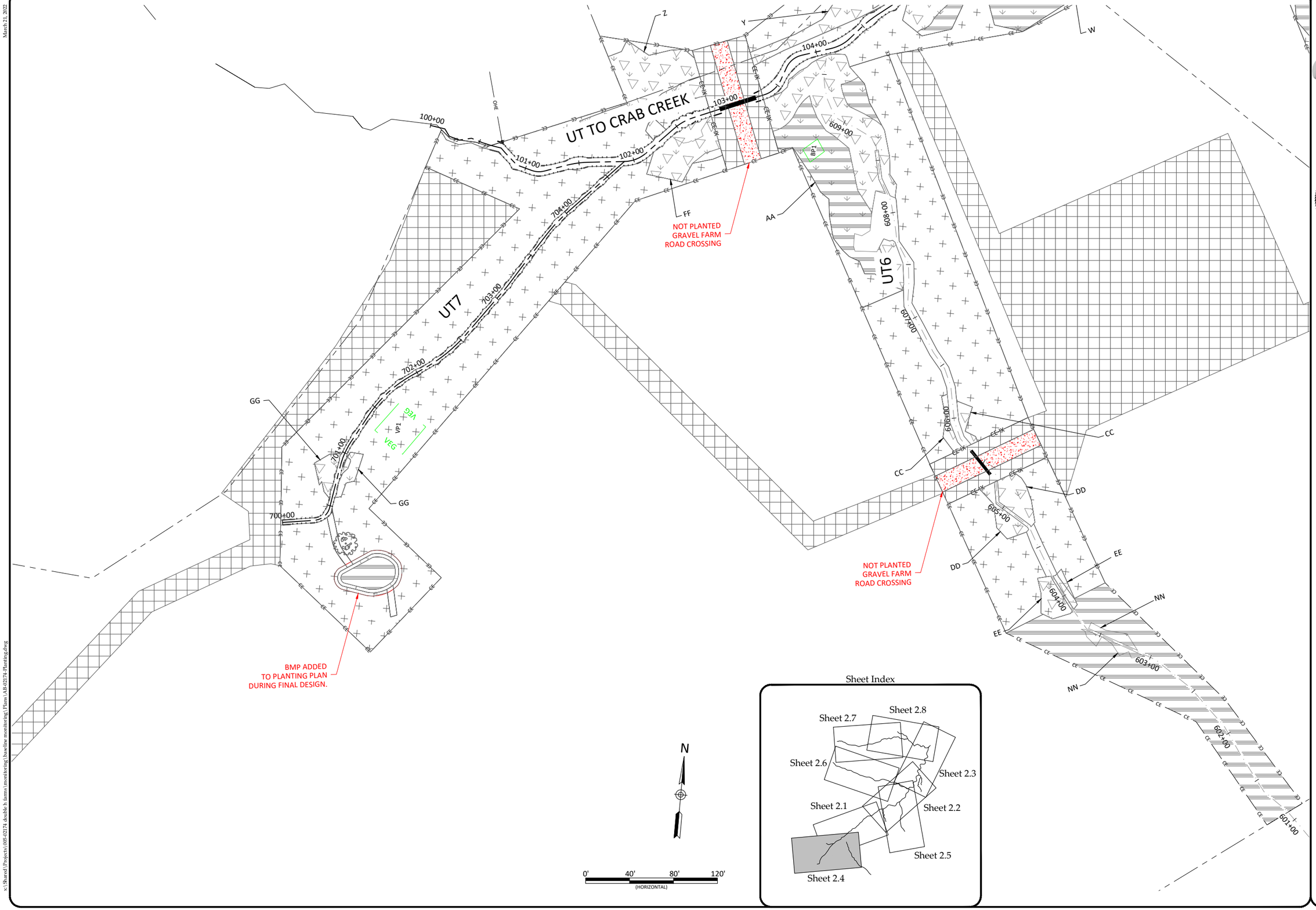
March 21, 2022



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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFF BROWN

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT7 & UT6
Planting

Revisions:

Date: March 21, 2022
Job Number: 005-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 2.4

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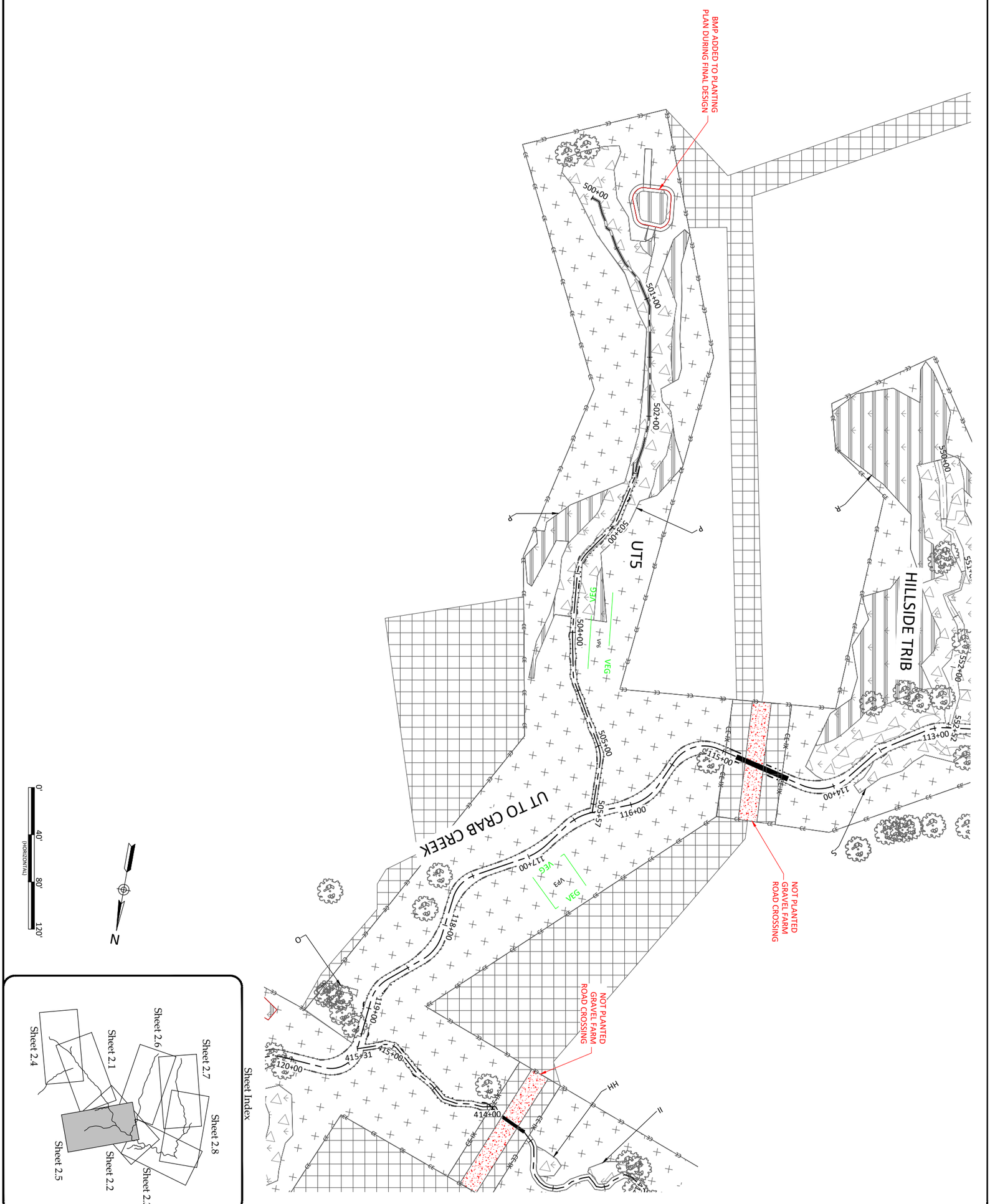

Date:	March 21, 2022
Job Number:	005-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Revisions:

2.5
Sheet

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT5
Planting

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JENNIFER N. KEATON

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1430 S. Mint Street, Ste 104
Charlotte, NC 28203
Tel: 704.332.7754
Fax: 704.332.3306
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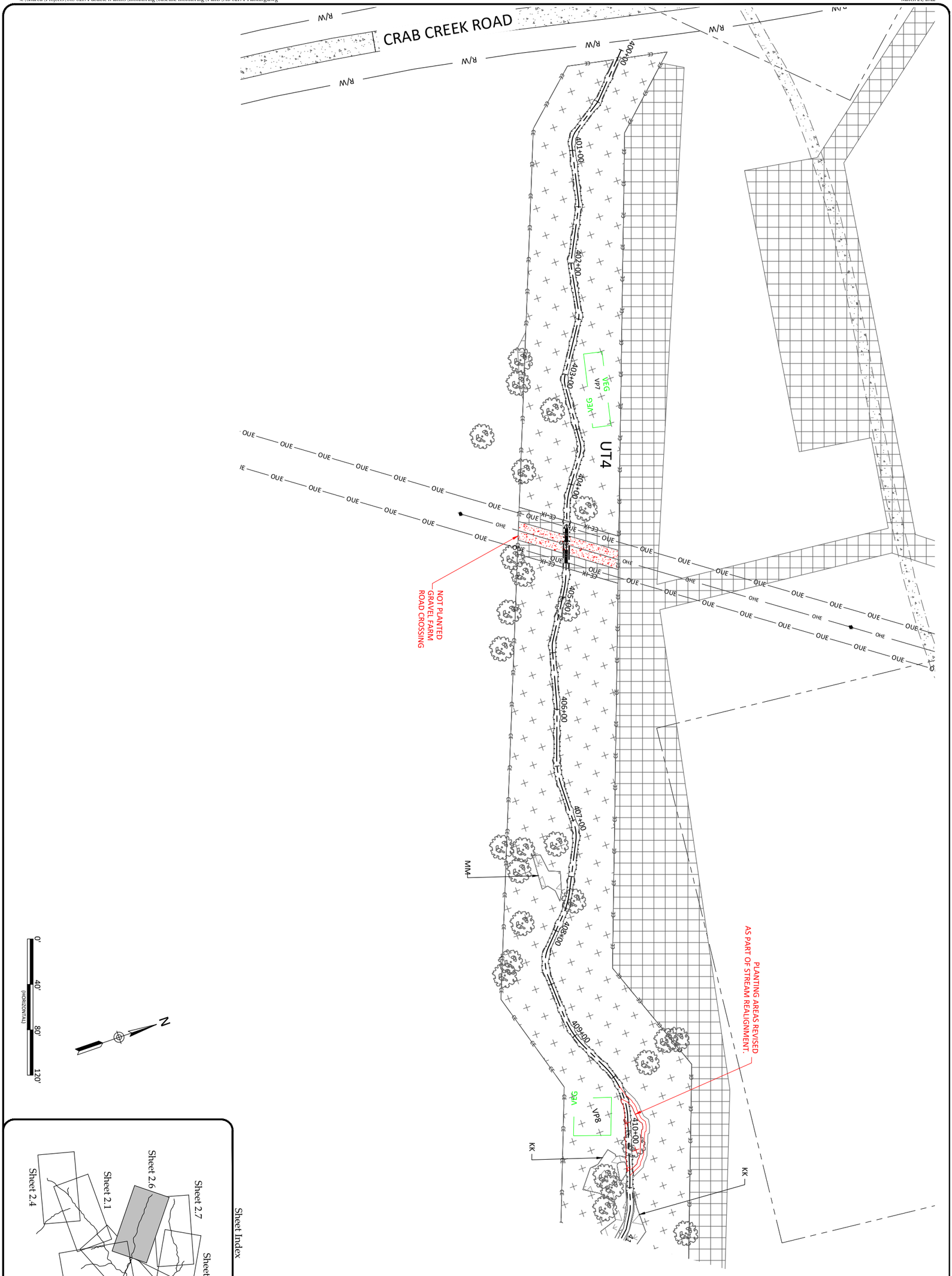

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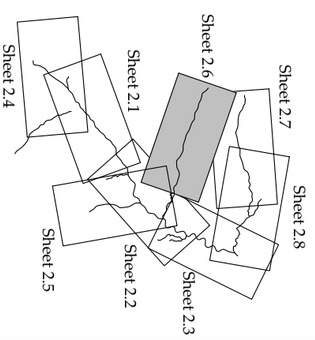

Date:	March 21, 2022
Job Number:	005-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Revisions:

2.6
Sheet

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT4
Planting

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. KEATON

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March 21, 2022

WILSON ROAD

UT1A

UT1A

NOT PLANTED
GRAVEL FARM
ROAD CROSSING

VEG

VP9

N

0' 40' 80' 120'
(HORIZONTAL)

Sheet Index

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON N. KEARNEY

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

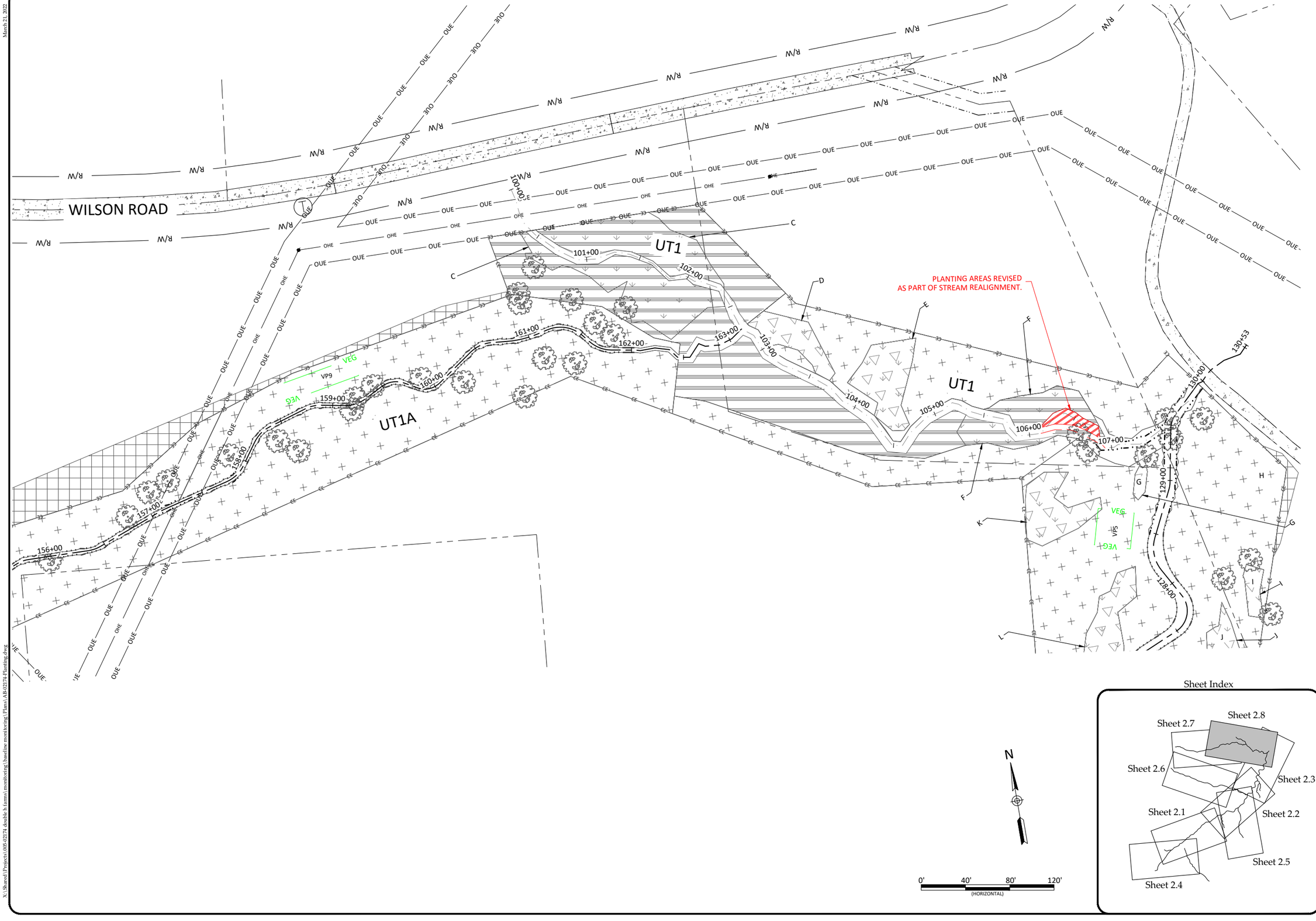
UT1A
Planting

Revisions:

Date:	March 21, 2022
Job Number:	105-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Sheet 2.7

March 21, 2022



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Fax: 704.332.3306
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON N. KING

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina
UT1 & UT1A Planting

Revisions:

Date:	March 21, 2022
Job Number:	105-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Sheet 2.8

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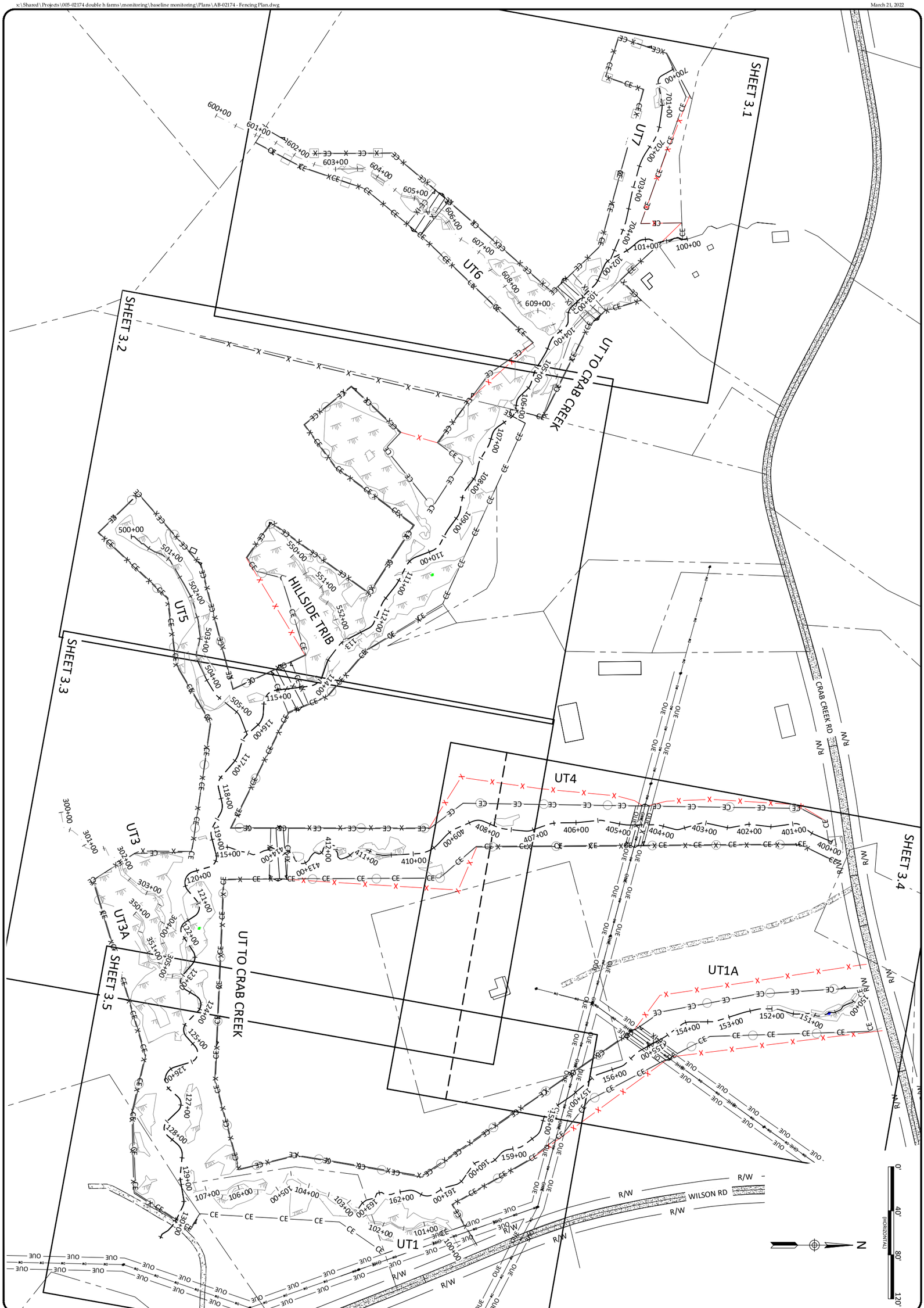
x:\Shared\Projects\005-02174 double h farms\monitoring\baseline monitoring\Plans\AB-02174 - Fencing Plan.dwg

March 21, 2022



Date:	March 21, 2022
Job Number:	005-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Revisions:

3.0

Sheet

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

Overview
Fencing Plan

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. KEATON

WILDLANDS ENGINEERING
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March 21, 2022

MATCH LINE - SHEET 3.2

FENCE SECTION TO BE ADJUSTED TO MATCH CONSERVATION EASEMENT IN YEAR ONE MAINTENANCE.

FENCE SECTION IN CONSERVATION EASEMENT TO BE REMOVED IN YEAR ONE MAINTENANCE. CATTLE HAVE BEEN EXCLUDED ON ADJACENT PARCELS.

STA: 100+09
FENCE NOT INSTALLED. NO CATTLE ACCESS

ADDED FENCE TO ENSURE CATTLE EXCLUSION.

UT TO CRAB CREEK

UT6

UT7

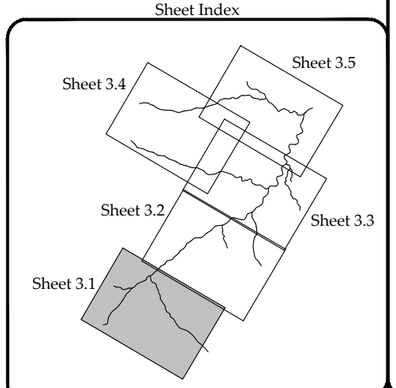
ONE

100+00 101+00 102+00 103+00 104+00 105+00 601+00 602+00 603+00 604+00 605+00 606+00 607+00 608+00 609+00 700+00 701+00 702+00 703+00 704+00

N

0' 40' 80' 120'
(HORIZONTAL)

Sheet Index



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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON M. KLEIN

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT6 & UT7
Fencing Plan

Revisions:

Date: March 21, 2022
Job Number: 05-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 3.1

March 21, 2022

MATCH LINE - SHEET 3.3

UT TO CRAB CREEK

HILLSIDE TRIB

UT5

FENCE SIMPLIFIED PER LANDOWNER REQUEST

FENCE SIMPLIFIED PER LANDOWNER REQUEST

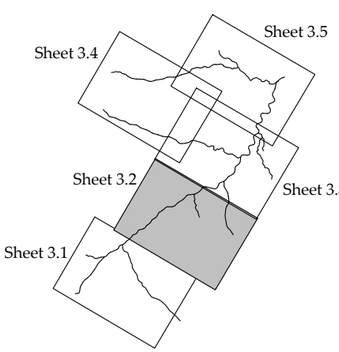
FENCE SECTION TO BE ADJUSTED TO MATCH CONSERVATION EASEMENT IN YEAR ONE MAINTENANCE.

MATCH LINE - SHEET 3.1

0' 40' 80' 120'
(HORIZONTAL)

N

Sheet Index



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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON I. KLEIN

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT to Crab Creek, Hillside Trib, and UT5
Fencing Plan

Revisions:

Date: March 21, 2022
Job Number: 005-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: ICK

Sheet 3.2

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March 21, 2022

MATCH LINE - SHEET 3.5

MATCH LINE - SHEET 3.4

MATCH LINE - SHEET 3.2

FENCE SIMPLIFIED PER LANDOWNER REQUEST

FENCE SIMPLIFIED PER LANDOWNER REQUEST

UT4

UT3A

UT3

UT TO CRAB CREEK

124+00 123+00 122+00 121+00 120+00 119+00 118+00 117+00 116+00 115+00 114+00

305+00 304+00 303+00 302+00 301+00 300+00

351+00 350+00

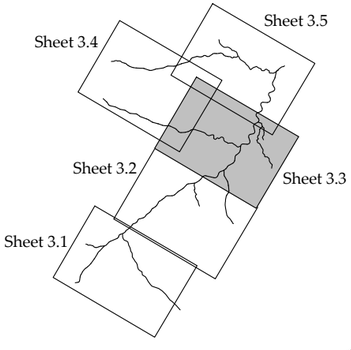
505+00 504+00

413+00 414+00 415+00 411+00 410+00 409+00 408+00 412+00

0' 40' 80' 120'
(HORIZONTAL)

N

Sheet Index



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Charlotte, NC 28203
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Fax: 704.332.3306
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON N. KEEVER

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina
UT to Crab Creek, UT3, UT3A, & UT4
Fencing Plan

Revisions:

Date: March 21, 2022
Job Number: 005-02174
Project Engineer: JNK
Drawn By: AMR
Checked By: JCK

Sheet 3.3

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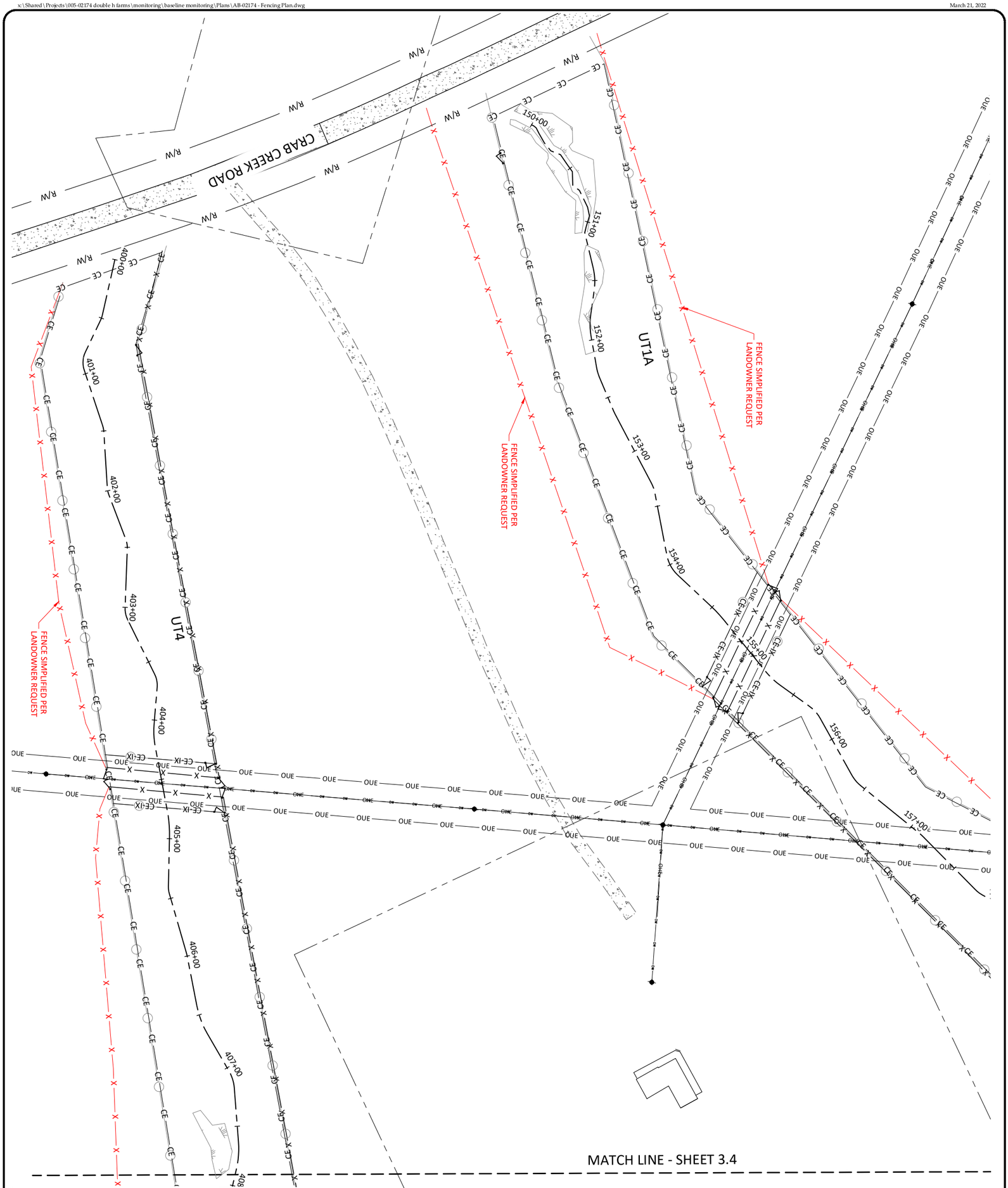

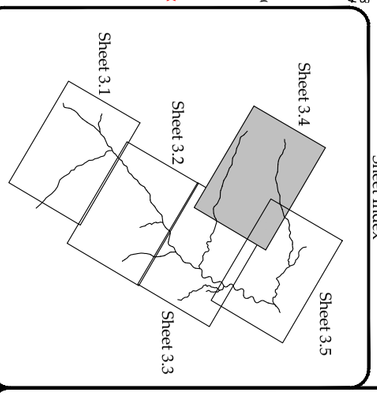

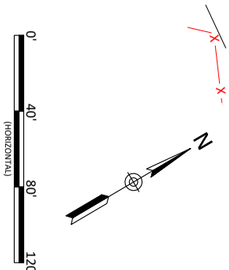

Date:	March 21, 2022
Job Number:	005-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Revisions:

3.4
Sheet

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT4 & UT1A
Fencing Plan

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. KEATON

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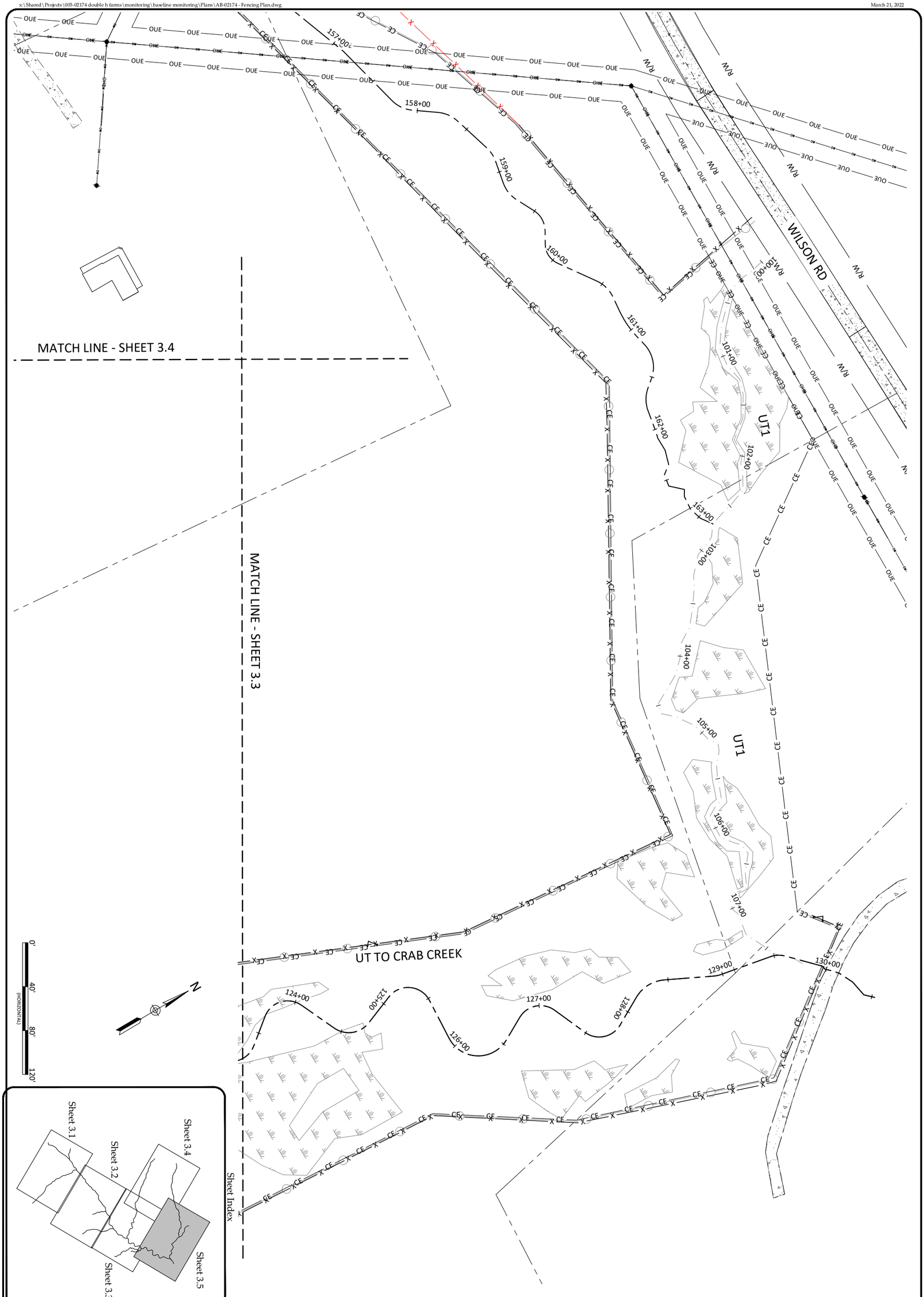


Date:	March 21, 2022
Job Number:	005-02174
Project Engineer:	JNK
Drawn By:	AMR
Checked By:	JCK

Revisions:

3.5
Sheet

Double H Farms Mitigation Site Record Drawings
Alleghany County, North Carolina

UT1, UT1A, & UT to Crab Creek
Fencing Plan

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. KEATON

WILDLANDS ENGINEERING
1430 S. Mint Street, Ste 104
Charlotte, NC 28203
Tel: 704.332.7754
Fax: 704.332.3306
Firm License No. F-0831

CERTIFICATE OF SURVEY AND ACCURACY

I, PHILLIP B. KEE, CERTIFY THAT THE GROUND TOPOGRAPHIC SURVEY PORTION OF THIS PROJECT WAS COMPLETED UNDER MY DIRECT SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY DIRECT SUPERVISION; THAT THIS SURVEY WAS PERFORMED AT THE 95% CONFIDENCE LEVEL TO MEET THE FEDERAL GEOGRAPHIC DATA COMMITTEE STANDARDS; THAT THIS SURVEY WAS PERFORMED TO THE CLASS A HORIZONTAL AND CLASS C VERTICAL WHERE APPLICABLE; THAT THE ORIGINAL DATA WAS OBTAINED BETWEEN THE DATES OF 10/4/21-12/6/21; THAT THE CONTOURS SHOWN AS BROKEN LINES MAY NOT MEET THE STATED STANDARD AND ALL COORDINATES ARE BASED ON NAD 83 (NSRS 2011) AND ALL ELEVATIONS ARE BASED ON NAVD 88; THAT THE GPS PORTION OF THIS PROJECT WAS TO PERFORM A GRID TIE TO THE NC STATE PLANE COORDINATE SYSTEM AND THE INFORMATION USED IS SHOWN & NOTED HEREON; THAT THIS MAP MEETS THE SPECIFICATIONS FOR TOPOGRAPHIC SURVEYS AS STATED IN TITLE 21, CHAPTER 56, SECTION .1606; THAT THIS MAP WAS NOT PREPARED IN ACCORDANCE WITH G.S. 47-30, AS AMENDED AND DOES NOT REPRESENT AN OFFICIAL BOUNDARY SURVEY.

GPS METADATA

SEE SURVEY CONTROL WILDLANDS ENGINEERING, INC. BY KEE MAPPING & SURVEYING, PA (LICENSE # C-3039); SIGNED, SEALED AND DATED ON JUNE 6, 2019 BY PHILLIP B. KEE, NC PLS (LICENSE #4647).

WITNESS MY ORIGINAL SIGNATURE, LICENSE NUMBER, AND SEAL THIS 1ST DAY OF FEBRUARY, 2022 A.D.

DocuSigned by:

PHILLIP B. KEE, PLS L-4647

D965004A7692407...

AN AS-BUILT SURVEY FOR:

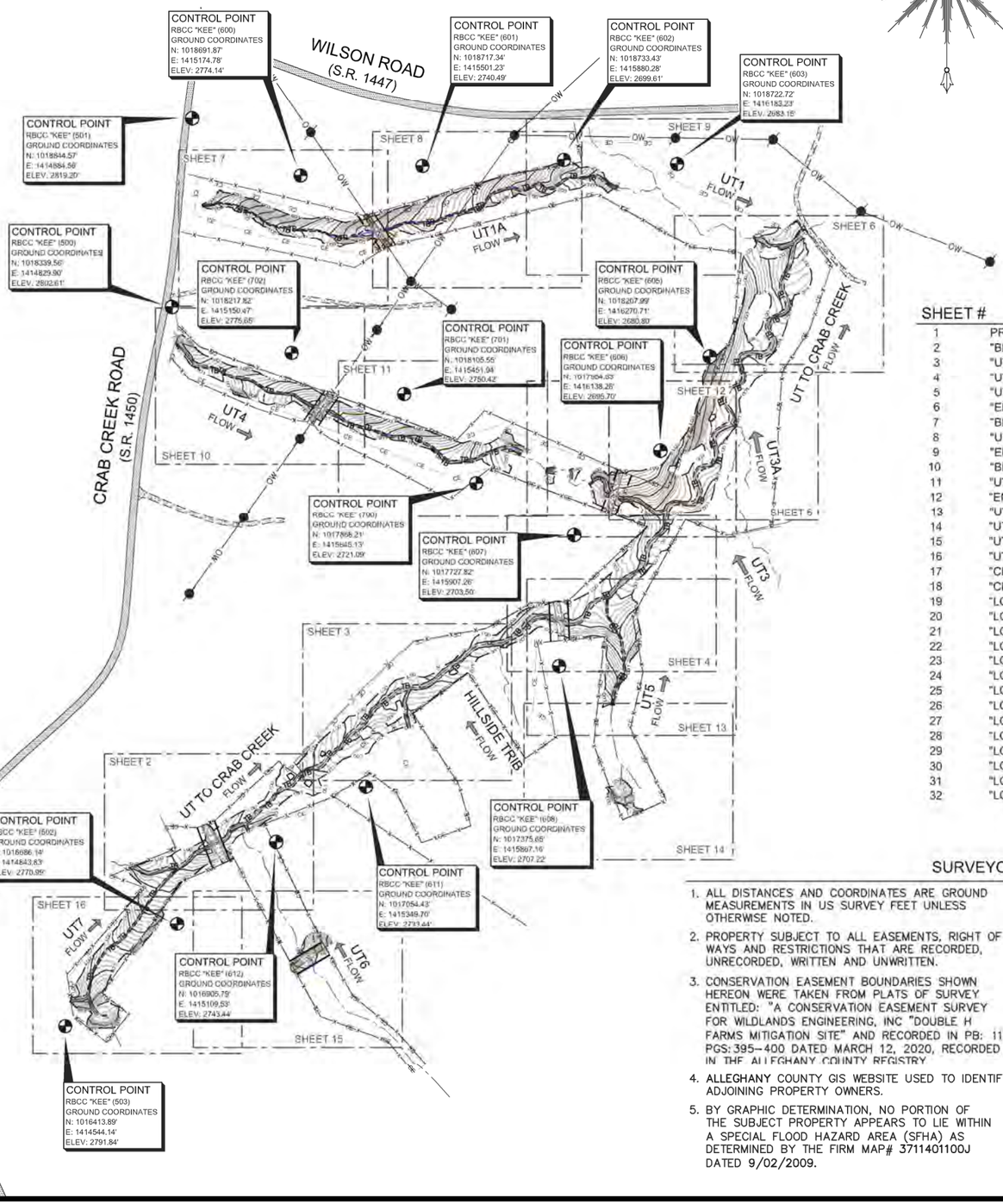
WILDLANDS ENGINEERING, INC.

"DOUBLE H FARMS MITIGATION SITE"

ALLEGHANY COUNTY, NORTH CAROLINA

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

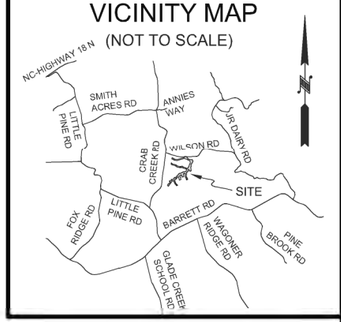
DMS SITE ID NO. 100082



N GRID NORTH NAD 83 (2011)

VICINITY MAP

(NOT TO SCALE)



LEGEND

#	STRUCTURE NUMBER
	1/2" RBCC (CROSS-SECTION REBAR)
	5/8" RBCC W/ "KEE" CONTROL CAP
	GAUGE (AS NOTED)
	PHOTO POINT
	UTILITY POLE
	DECIDUOUS TREE
	LOG SILL
	ROCK SILL
	COVER LOG
	LOG J-HOOK
	LOG OR BOULDER J-HOOK W/ SILL
	BRUSH TOE
	BOULDER TOE
	RIFFLE
	GRAVEL
	BEDROCK
	RIP RAP
	SOIL ROADBED
	ASPHALT
2550	MINOR CONTOUR
2550	MAJOR CONTOUR
LOD	LIMITS OF DISTURBANCE
	THALWEG
TB	TOP OF BANK
	DESIGN CENTERLINE
X	NEW FENCE
X	OLD FENCE
OW	OVERHEAD WIRE
CE	INTERNAL CE CROSSING
CE	CONSERVATION EASEMENT
RBCC	REBAR W/ CAP SET IN CONCRETE
INV	INVERT
ELEV	ELEVATION
NAVD	NORTH AMERICAN VERTICAL DATUM
NAD	NORTH AMERICAN DATUM
NSRS	NATIONAL SPATIAL REFERENCE SYSTEM
CMP	CORRUGATED METAL PIPE
VP	VEGETATED PLOT
STA	STATION

SHEET #	SHEET TITLE
1	PROJECT OVERVIEW: DOUBLE H FARMS MITIGATION SITE"
2	"BEGIN UT TO CRAB CREEK & END UT7"
3	"UT TO CRAB CREEK"
4	"UT TO CRAB CREEK"
5	"UT TO CRAB CREEK"
6	"END UT TO CRAB CREEK & UT1"
7	"BEGIN UT1A"
8	"UT1A"
9	"END UT1A"
10	"BEGIN UT4"
11	"UT4"
12	"END UT4"
13	"UT5"
14	"UT5-BMP2"
15	"UT6-PERMANENT CULVER CROSSING 3"
16	"UT7 & UT7-BMP1"
17	"CROSS-SECTIONS 1-9"
18	"CROSS-SECTIONS 10-14"
19	"LONGITUDINAL PROFILE- UT TO CRAB CREEK"
20	"LONGITUDINAL PROFILE- UT TO CRAB CREEK"
21	"LONGITUDINAL PROFILE- UT TO CRAB CREEK"
22	"LONGITUDINAL PROFILE- UT TO CRAB CREEK"
23	"LONGITUDINAL PROFILE- UT TO CRAB CREEK"
24	"LONGITUDINAL PROFILE- UT1 & UT1A"
25	"LONGITUDINAL PROFILE- UT1A"
26	"LONGITUDINAL PROFILE- UT1A"
27	"LONGITUDINAL PROFILE- UT1A"
28	"LONGITUDINAL PROFILE- UT4"
29	"LONGITUDINAL PROFILE- UT4"
30	"LONGITUDINAL PROFILE- UT4"
31	"LONGITUDINAL PROFILE- UT5"
32	"LONGITUDINAL PROFILE- UT7"

SURVEYOR'S NOTES:

1. ALL DISTANCES AND COORDINATES ARE GROUND MEASUREMENTS IN US SURVEY FEET UNLESS OTHERWISE NOTED.
2. PROPERTY SUBJECT TO ALL EASEMENTS, RIGHT OF WAYS AND RESTRICTIONS THAT ARE RECORDED, UNRECORDED, WRITTEN AND UNWRITTEN.
3. CONSERVATION EASEMENT BOUNDARIES SHOWN HEREON WERE TAKEN FROM PLATS OF SURVEY ENTITLED: "A CONSERVATION EASEMENT SURVEY FOR WILDLANDS ENGINEERING, INC "DOUBLE H FARMS MITIGATION SITE" AND RECORDED IN PB: 11 PGS: 395-400 DATED MARCH 12, 2020, RECORDED IN THE ALLEGHANY COUNTY REGISTRY.
4. ALLEGHANY COUNTY GIS WEBSITE USED TO IDENTIFY ADJOINING PROPERTY OWNERS.
5. BY GRAPHIC DETERMINATION, NO PORTION OF THE SUBJECT PROPERTY APPEARS TO LIE WITHIN A SPECIAL FLOOD HAZARD AREA (SFHA) AS DETERMINED BY THE FIRM MAP# 3711401100J DATED 9/02/2009.
6. STATE PLANE COORDINATES AND ELEVATIONS WERE DERIVED FROM THE CONTROL SURVEY PREPARED BY KEE MAPPING & SURVEYING. THE HORIZONTAL DATUM IS NAD 83 (2011) AND THE VERTICAL DATUM IS NAVD(88). ALL COORDINATES SHOWN HEREON ARE GROUND MEASUREMENTS IN US SURVEY FEET.
7. UTILITIES WERE LOCATED BASED ON VISIBLE ABOVE GROUND STRUCTURES, THEREFORE THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE OR MAY BE PRESENT AND NOT SHOWN HEREON. CALL 1-800-632-4949 BEFORE DIGGING.
8. STATIONING AND STREAM LABELS FOR PLAN AND PROFILES ARE BASED OFF OF FINAL PLANS AND DESIGN CENTERLINES PROVIDED BY WILDLANDS ENGINEERING, INC.
9. CONTOUR INTERVAL: 1 FOOT VERTICAL DATUM: NAVD 88
10. AREA OF LIMITS OF DISTURBANCE: 9.91 ACRES
11. WETLANDS SHOWN HEREON WERE PROVIDED BY WILDLANDS ENGINEERING, INC.

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:

D965004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88

CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

PROJECT OVERVIEW

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET: 1 OF 32

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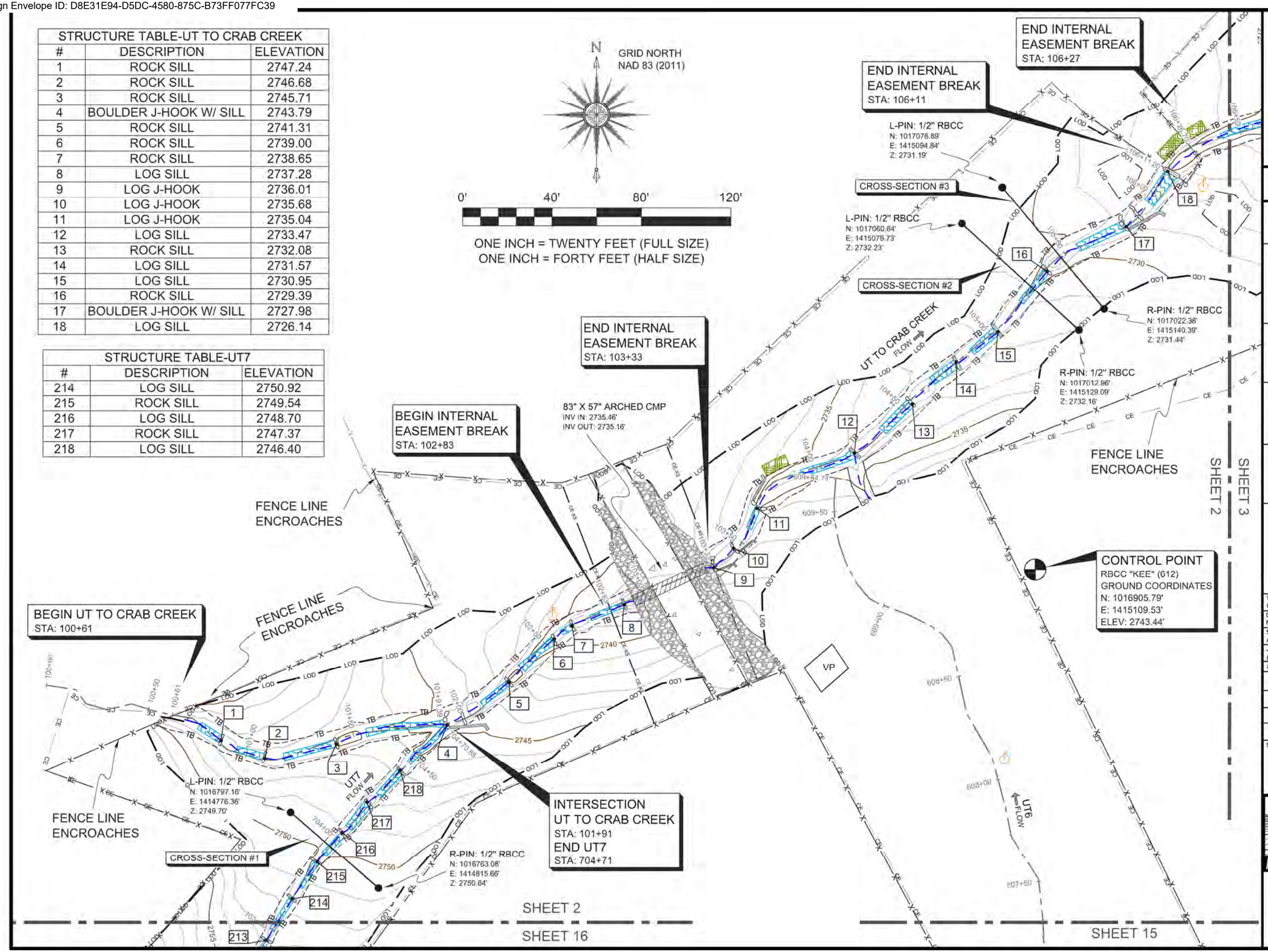
License # C-3039

STRUCTURE TABLE-UT TO CRAB CREEK		
#	DESCRIPTION	ELEVATION
1	ROCK SILL	2747.24
2	ROCK SILL	2746.68
3	ROCK SILL	2745.71
4	BOULDER J-HOOK W/ SILL	2743.79
5	ROCK SILL	2741.31
6	ROCK SILL	2739.00
7	ROCK SILL	2738.65
8	LOG SILL	2737.28
9	LOG J-HOOK	2736.01
10	LOG J-HOOK	2735.68
11	LOG J-HOOK	2735.04
12	LOG SILL	2733.47
13	ROCK SILL	2732.08
14	LOG SILL	2731.57
15	LOG SILL	2730.95
16	ROCK SILL	2729.39
17	BOULDER J-HOOK W/ SILL	2727.98
18	LOG SILL	2726.14

STRUCTURE TABLE-UT7		
#	DESCRIPTION	ELEVATION
214	LOG SILL	2750.92
215	ROCK SILL	2749.54
216	LOG SILL	2748.70
217	ROCK SILL	2747.37
218	LOG SILL	2746.40



SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D965004A7692407

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
BEGIN
UT TO CRAB CREEK
&
END UT7

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:
2 OF 32

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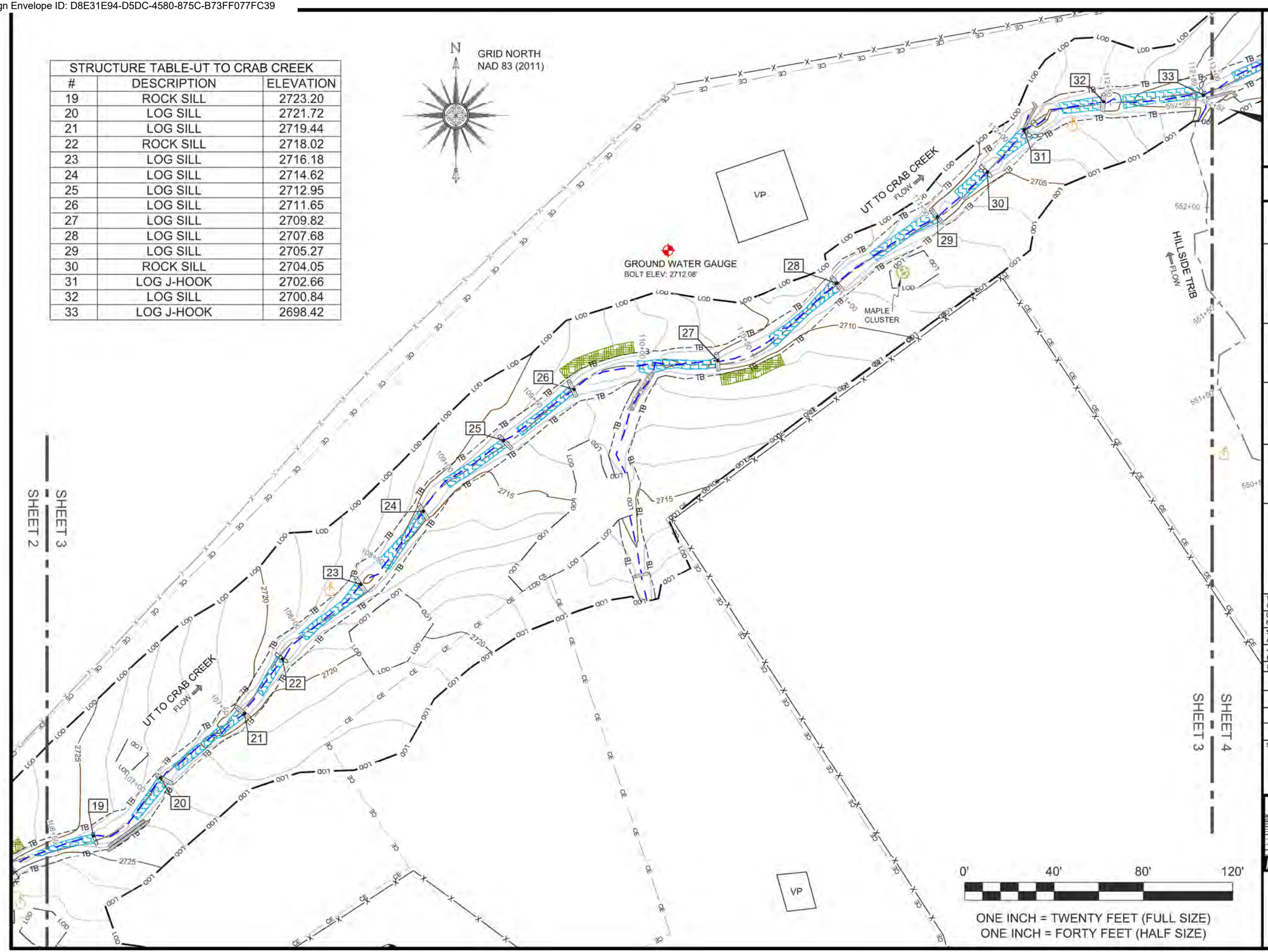
STRUCTURE TABLE-UT TO CRAB CREEK		
#	DESCRIPTION	ELEVATION
19	ROCK SILL	2723.20
20	LOG SILL	2721.72
21	LOG SILL	2719.44
22	ROCK SILL	2718.02
23	LOG SILL	2716.18
24	LOG SILL	2714.62
25	LOG SILL	2712.95
26	LOG SILL	2711.65
27	LOG SILL	2709.82
28	LOG SILL	2707.68
29	LOG SILL	2705.27
30	ROCK SILL	2704.05
31	LOG J-HOOK	2702.66
32	LOG SILL	2700.84
33	LOG J-HOOK	2698.42



SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: D9650D4A4092407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

UT TO CRAB CREEK

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET: 3 OF 32

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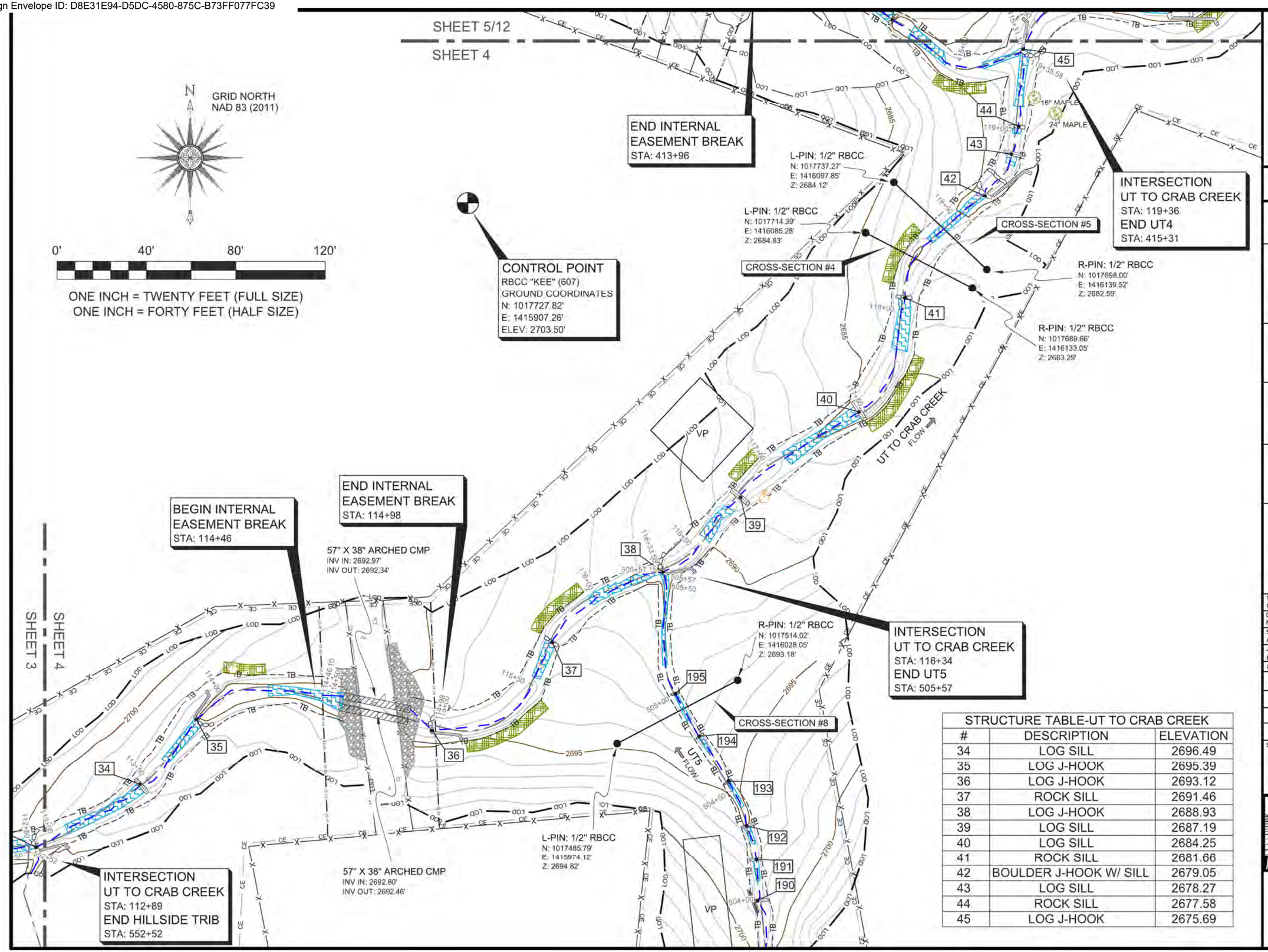

STRUCTURE TABLE-UT TO CRAB CREEK		
#	DESCRIPTION	ELEVATION
34	LOG SILL	2696.49
35	LOG J-HOOK	2695.39
36	LOG J-HOOK	2693.12
37	ROCK SILL	2691.46
38	LOG J-HOOK	2688.93
39	LOG SILL	2687.19
40	LOG SILL	2684.25
41	ROCK SILL	2681.66
42	BOULDER J-HOOK W/ SILL	2679.05
43	LOG SILL	2678.27
44	ROCK SILL	2677.58
45	LOG J-HOOK	2675.69

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D965004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
UT TO CRAB CREEK

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET: 4 OF 32

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STRUCTURE TABLE-UT TO CRAB CREEK		
#	DESCRIPTION	ELEVATION
46	BOULDER J-HOOK W/ SILL	2673.39
47	LOG SILL	2671.55
48	ROCK SILL	2670.20
49	LOG SILL	2667.95
50	LOG J-HOOK	2666.46
51	ROCK SILL	2664.97

0' 40' 80' 120'

ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

GRID NORTH
NAD 83 (2011)

SHEET 6

SHEET 5

CREST GAUGE
BOLT ELEV: 2667.07'

R-PIN: 1/2" RBCC
N: 1018188.72'
E: 1416381.43'
Z: 2665.16'

R-PIN: 1/2" RBCC
N: 1018183.97'
E: 1416380.27'
Z: 2665.78'

L-PIN: 1/2" RBCC
N: 1018165.76'
E: 1416331.70'
Z: 2667.29'

CROSS-SECTION #6

UT TO CRAB CREEK FLOW

INTERSECTION
UT TO CRAB CREEK
STA: 123+05
END UT3
STA: 305+70

CONTROL POINT
RBCC "KEE" (606)
GROUND COORDINATES
N: 1017954.53'
E: 1416138.26'
ELEV: 2695.70'

GROUND WATER GAUGE
BOLT ELEV: 2673.48'

END UT3A
STA: 351+45.7

UT3 FLOW

UT3A FLOW

BEGIN UT3A
STA: 350+00.0

42" X 29" ARCHED CMP
INV IN: 2685.99'
INV OUT: 2685.53'

BEGIN INTERNAL EASEMENT BREAK
STA: 413+54

SHEET 5/12

SHEET 4

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D9650044769240...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
UT TO CRAB CREEK

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET: 5 OF 32

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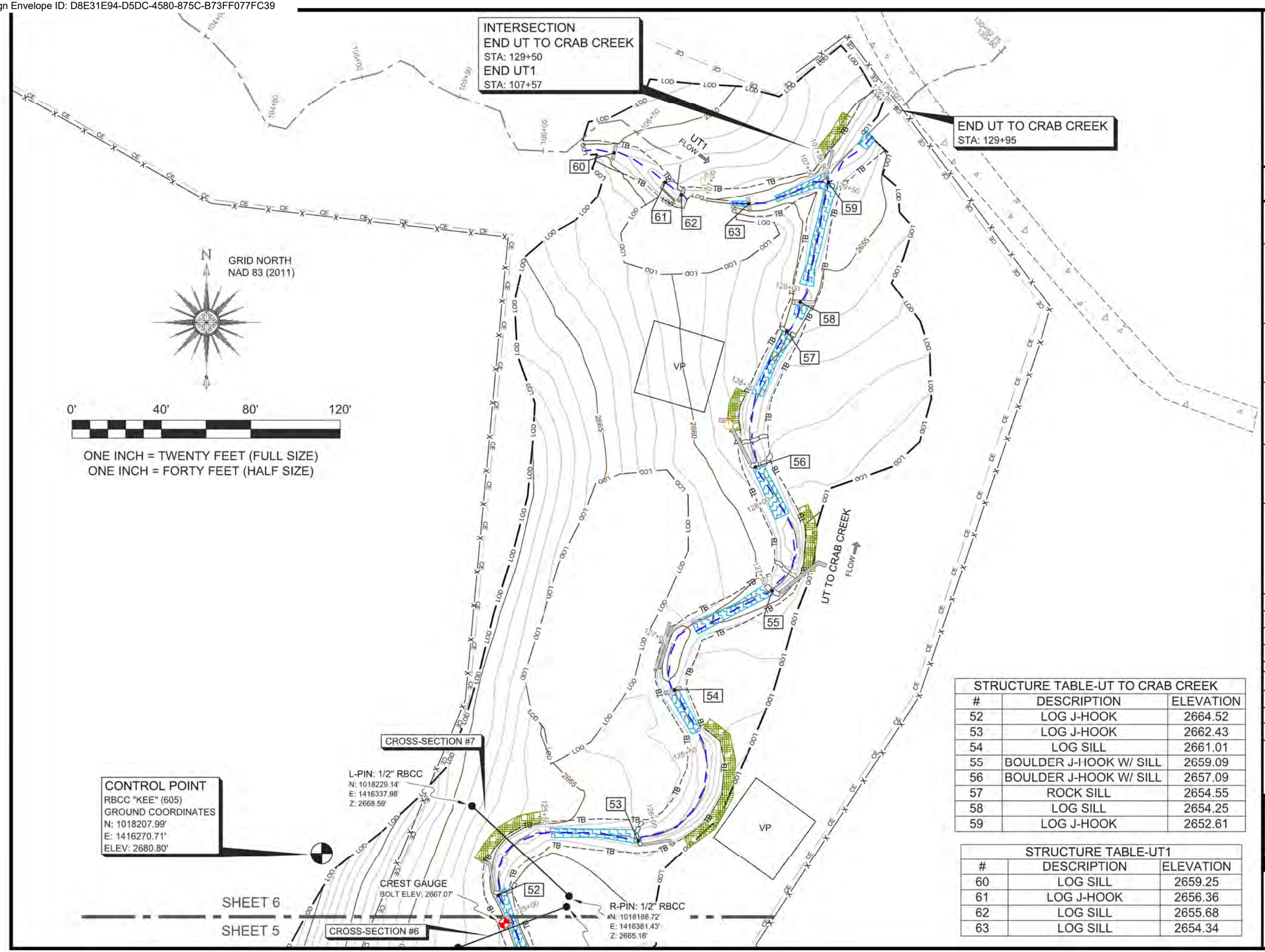

STRUCTURE TABLE-UT TO CRAB CREEK		
#	DESCRIPTION	ELEVATION
52	LOG J-HOOK	2664.52
53	LOG J-HOOK	2662.43
54	LOG SILL	2661.01
55	BOULDER J-HOOK W/ SILL	2659.09
56	BOULDER J-HOOK W/ SILL	2657.09
57	ROCK SILL	2654.55
58	LOG SILL	2654.25
59	LOG J-HOOK	2652.61

STRUCTURE TABLE-UT1		
#	DESCRIPTION	ELEVATION
60	LOG SILL	2659.25
61	LOG J-HOOK	2656.36
62	LOG SILL	2655.68
63	LOG SILL	2654.34

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D865004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
END
UT TO CRAB CREEK
&
UT1

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET: 6 OF 32

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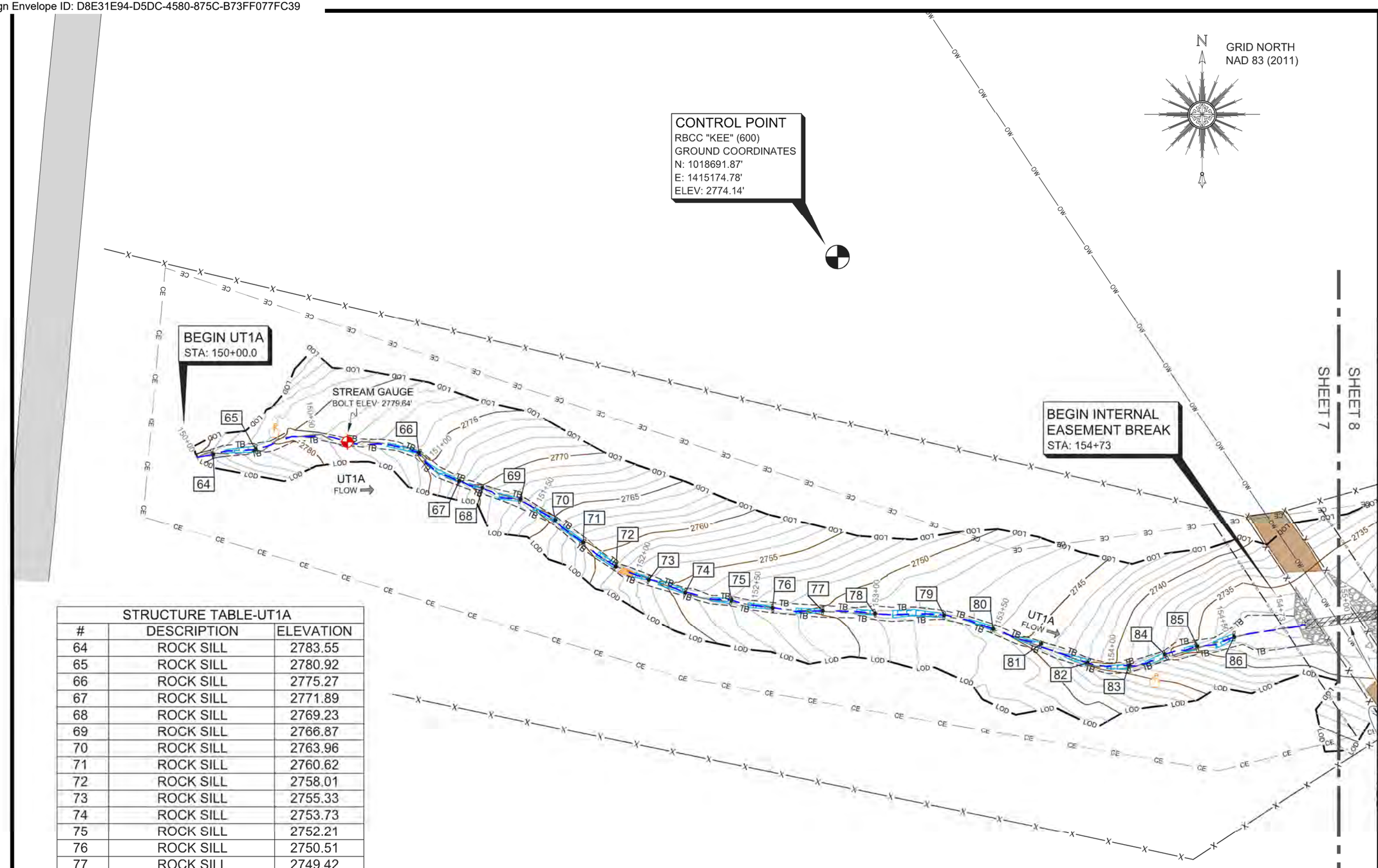

STRUCTURE TABLE-UT1A		
#	DESCRIPTION	ELEVATION
64	ROCK SILL	2783.55
65	ROCK SILL	2780.92
66	ROCK SILL	2775.27
67	ROCK SILL	2771.89
68	ROCK SILL	2769.23
69	ROCK SILL	2766.87
70	ROCK SILL	2763.96
71	ROCK SILL	2760.62
72	ROCK SILL	2758.01
73	ROCK SILL	2755.33
74	ROCK SILL	2753.73
75	ROCK SILL	2752.21
76	ROCK SILL	2750.51
77	ROCK SILL	2749.42
78	ROCK SILL	2748.15
79	ROCK SILL	2746.71
80	ROCK SILL	2745.78
81	ROCK SILL	2743.97
82	ROCK SILL	2741.36
83	ROCK SILL	2738.11
84	ROCK SILL	2736.22
85	ROCK SILL	2734.29
86	ROCK SILL	2732.17

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: 3B9668A4769240A...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
BEGIN UT1A

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET: 7 OF 32

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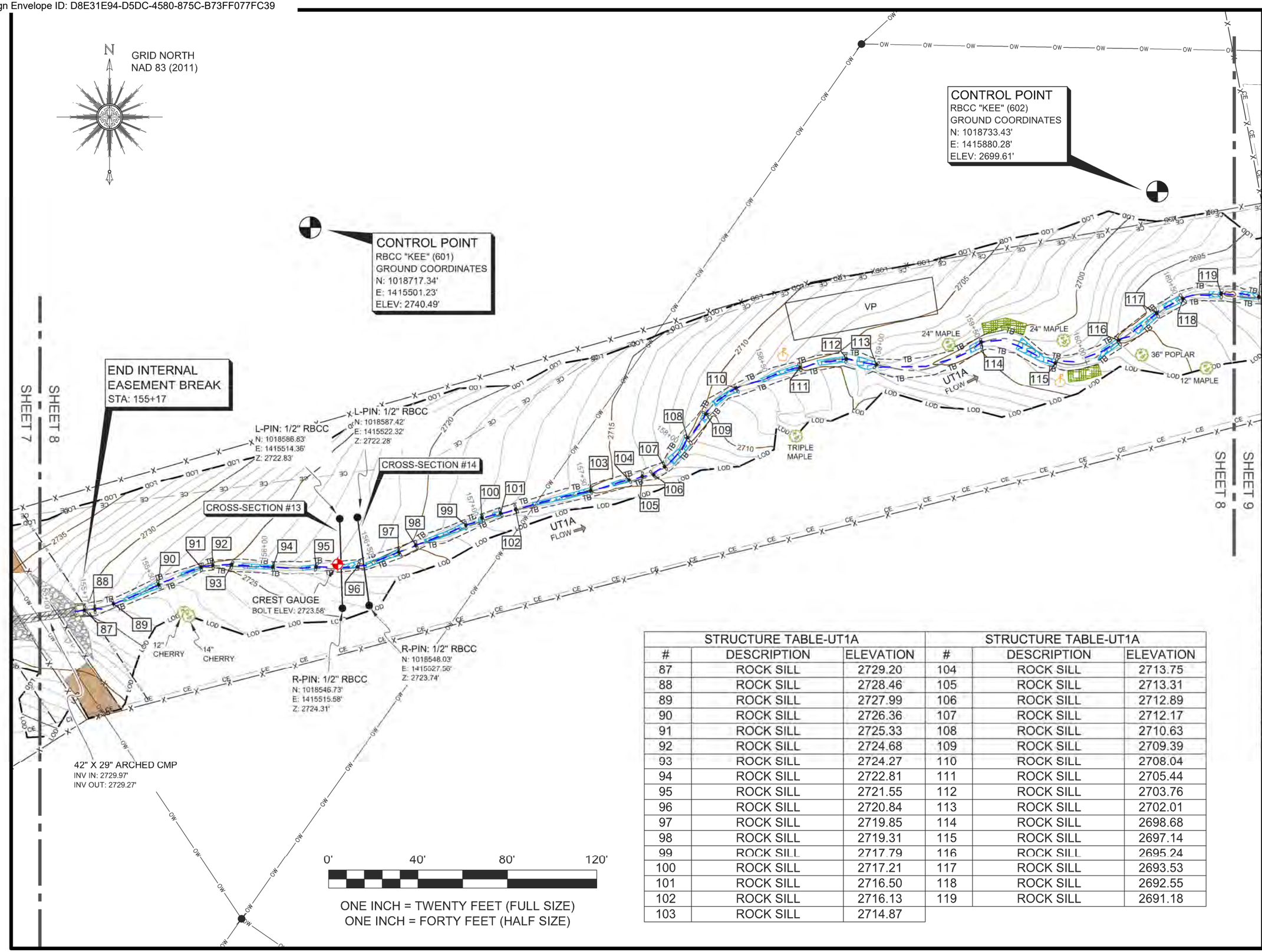

STRUCTURE TABLE-UT1A			STRUCTURE TABLE-UT1A		
#	DESCRIPTION	ELEVATION	#	DESCRIPTION	ELEVATION
87	ROCK SILL	2729.20	104	ROCK SILL	2713.75
88	ROCK SILL	2728.46	105	ROCK SILL	2713.31
89	ROCK SILL	2727.99	106	ROCK SILL	2712.89
90	ROCK SILL	2726.36	107	ROCK SILL	2712.17
91	ROCK SILL	2725.33	108	ROCK SILL	2710.63
92	ROCK SILL	2724.68	109	ROCK SILL	2709.39
93	ROCK SILL	2724.27	110	ROCK SILL	2708.04
94	ROCK SILL	2722.81	111	ROCK SILL	2705.44
95	ROCK SILL	2721.55	112	ROCK SILL	2703.76
96	ROCK SILL	2720.84	113	ROCK SILL	2702.01
97	ROCK SILL	2719.85	114	ROCK SILL	2698.68
98	ROCK SILL	2719.31	115	ROCK SILL	2697.14
99	ROCK SILL	2717.79	116	ROCK SILL	2695.24
100	ROCK SILL	2717.21	117	ROCK SILL	2693.53
101	ROCK SILL	2716.50	118	ROCK SILL	2692.55
102	ROCK SILL	2716.13	119	ROCK SILL	2691.18
103	ROCK SILL	2714.87			

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: 3956A03A7892407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
UT1A

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:
8 OF 32

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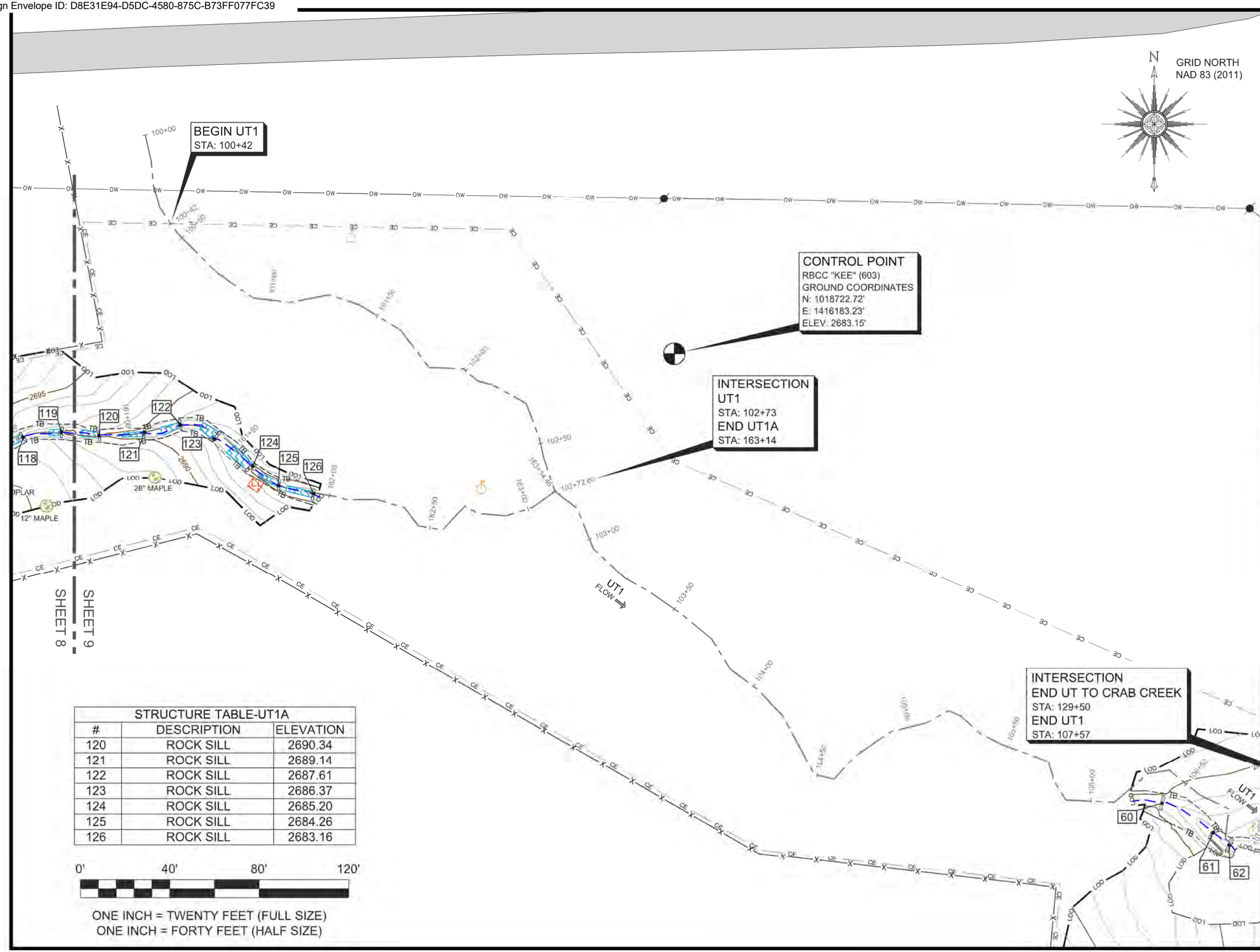

STRUCTURE TABLE-UT1A		
#	DESCRIPTION	ELEVATION
120	ROCK SILL	2690.34
121	ROCK SILL	2689.14
122	ROCK SILL	2687.61
123	ROCK SILL	2686.37
124	ROCK SILL	2685.20
125	ROCK SILL	2684.26
126	ROCK SILL	2683.16

0' 40' 80' 120'

ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4047 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D0530044A7692407

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

END UT1A

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

9 OF 32

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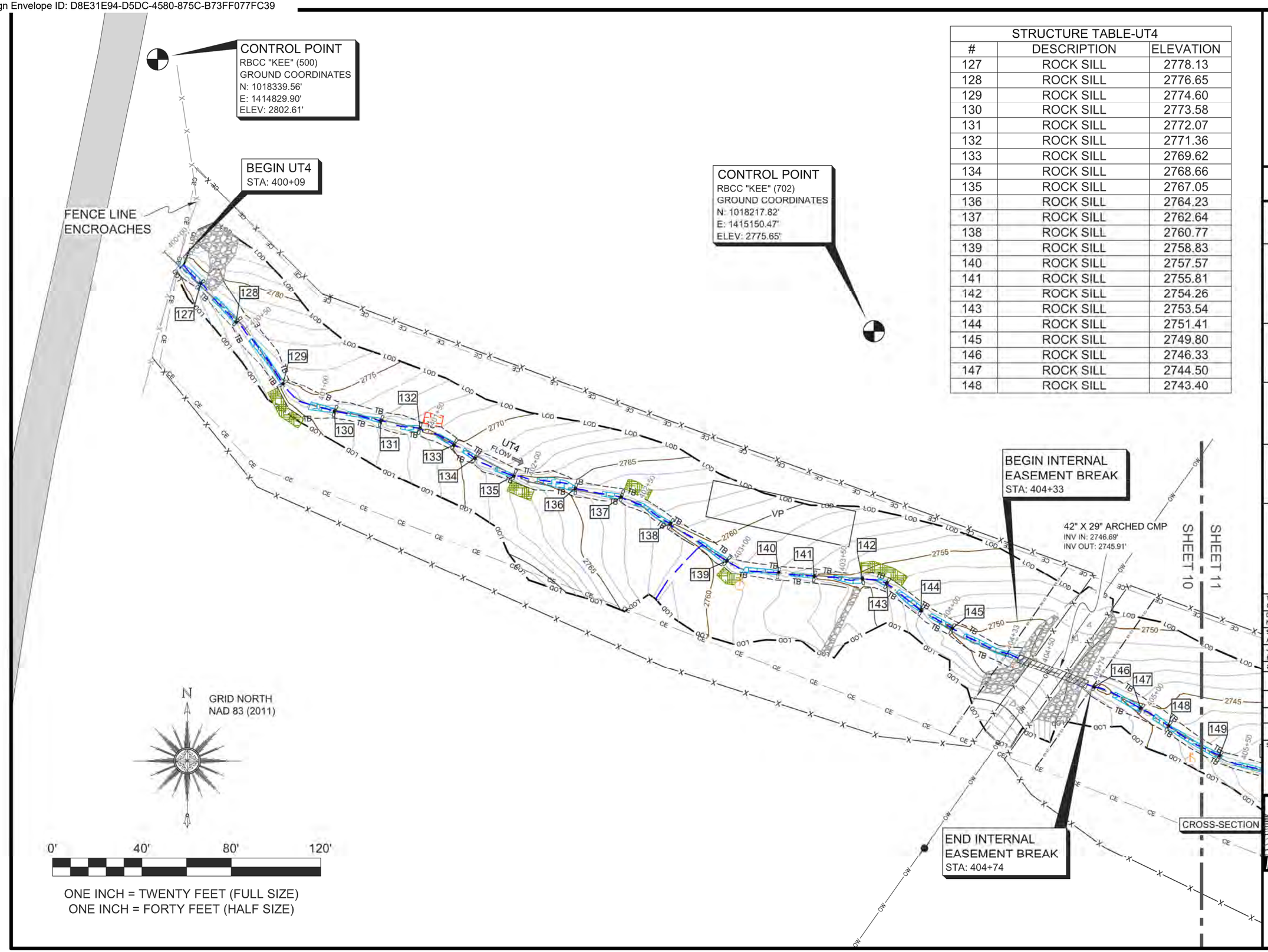

STRUCTURE TABLE-UT4		
#	DESCRIPTION	ELEVATION
127	ROCK SILL	2778.13
128	ROCK SILL	2776.65
129	ROCK SILL	2774.60
130	ROCK SILL	2773.58
131	ROCK SILL	2772.07
132	ROCK SILL	2771.36
133	ROCK SILL	2769.62
134	ROCK SILL	2768.66
135	ROCK SILL	2767.05
136	ROCK SILL	2764.23
137	ROCK SILL	2762.64
138	ROCK SILL	2760.77
139	ROCK SILL	2758.83
140	ROCK SILL	2757.57
141	ROCK SILL	2755.81
142	ROCK SILL	2754.26
143	ROCK SILL	2753.54
144	ROCK SILL	2751.41
145	ROCK SILL	2749.80
146	ROCK SILL	2746.33
147	ROCK SILL	2744.50
148	ROCK SILL	2743.40

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: D96500A7E92407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

BEGIN UT4

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

10 OF 32

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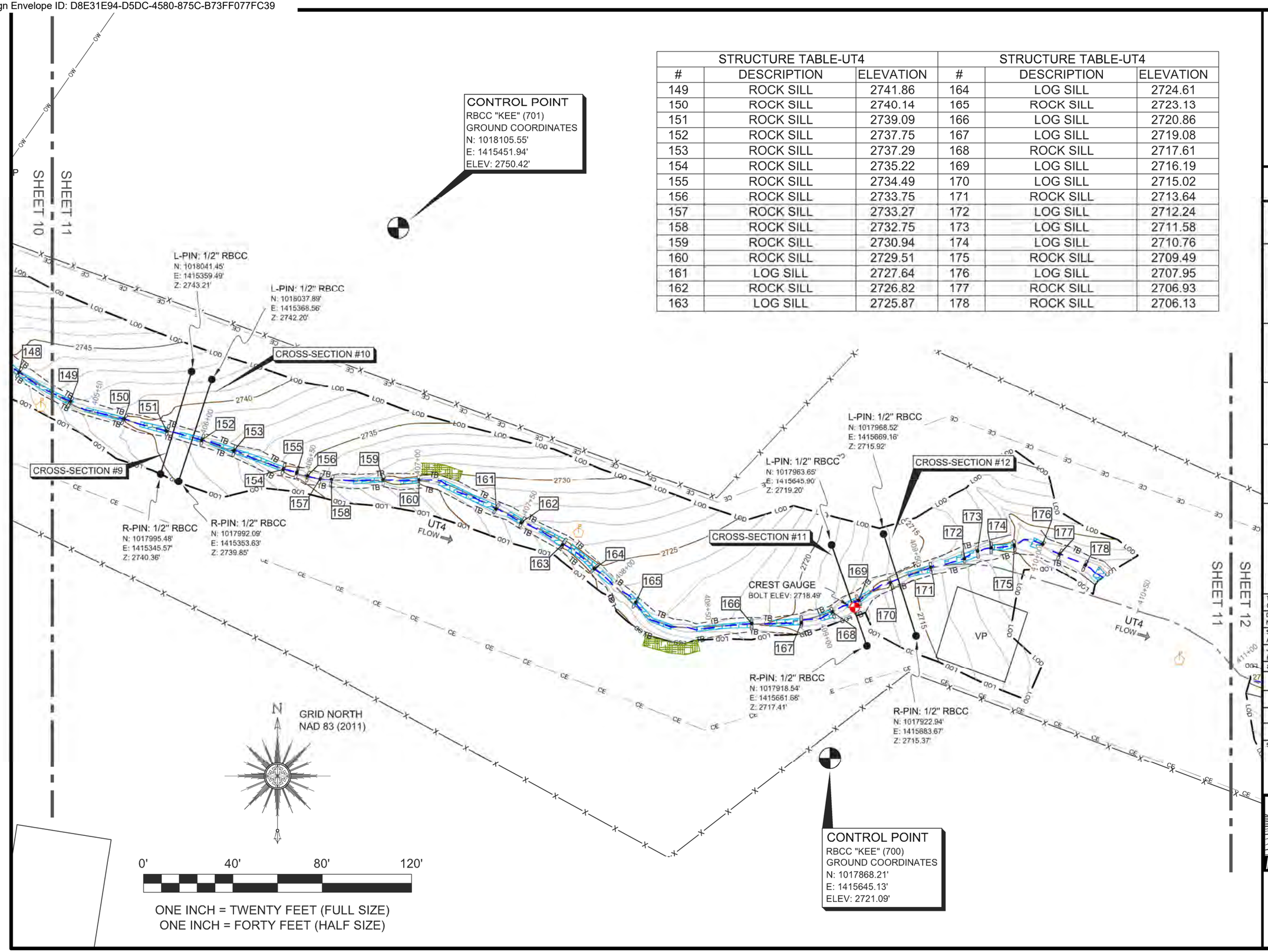

STRUCTURE TABLE-UT4			STRUCTURE TABLE-UT4		
#	DESCRIPTION	ELEVATION	#	DESCRIPTION	ELEVATION
149	ROCK SILL	2741.86	164	LOG SILL	2724.61
150	ROCK SILL	2740.14	165	ROCK SILL	2723.13
151	ROCK SILL	2739.09	166	LOG SILL	2720.86
152	ROCK SILL	2737.75	167	LOG SILL	2719.08
153	ROCK SILL	2737.29	168	ROCK SILL	2717.61
154	ROCK SILL	2735.22	169	LOG SILL	2716.19
155	ROCK SILL	2734.49	170	LOG SILL	2715.02
156	ROCK SILL	2733.75	171	ROCK SILL	2713.64
157	ROCK SILL	2733.27	172	LOG SILL	2712.24
158	ROCK SILL	2732.75	173	LOG SILL	2711.58
159	ROCK SILL	2730.94	174	LOG SILL	2710.76
160	ROCK SILL	2729.51	175	ROCK SILL	2709.49
161	LOG SILL	2727.64	176	LOG SILL	2707.95
162	ROCK SILL	2726.82	177	ROCK SILL	2706.93
163	LOG SILL	2725.87	178	ROCK SILL	2706.13

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: 4D065004A7642407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

UT4

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

11 OF 32

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(828) 575-9021
www.keemap.com
License # C-3039

N
GRID NORTH
NAD 83 (2011)

STRUCTURE TABLE-UT4		
#	DESCRIPTION	ELEVATION
179	ROCK SILL	2685.87
180	ROCK SILL	2683.19
181	ROCK SILL	2680.74

CONTROL POINT
RBCC "KEE" (606)
GROUND COORDINATES
N: 1017954.53'
E: 1416138.26'
ELEV: 2695.70'

GROUND WATER GAUGE
BOLT ELEV: 2673.48'

UT TO CRAB CREEK
FLOW

UT3
FLOW

42" X 29" ARCHED CMP
INV IN: 2685.99'
INV OUT: 2685.53'

BEGIN INTERNAL EASEMENT BREAK
STA: 413+54

END INTERNAL EASEMENT BREAK
STA: 413+96

L-PIN: 1/2" RBCC
N: 1017737.27'
E: 1416097.85'
Z: 2684.12'

L-PIN: 1/2" RBCC
N: 1017714.39'
E: 1416085.28'
2684.83'

INTERSECTION
UT TO CRAB CREEK
STA: 119+36
END UT4
STA: 415+31

CROSS-SECTION #5

15" MAPLE
24" MAPLE

SHEET 11
SHEET 12
SHEET 5/12
SHEET 4

0' 40' 80' 120'
ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SEAL:
NORTH CAROLINA PROFESSIONAL SEAL L-5047 LAND SURVEYOR PHILLIP B. KEE
DocuSigned by:
D965004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
END UT4

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:
12 OF 32

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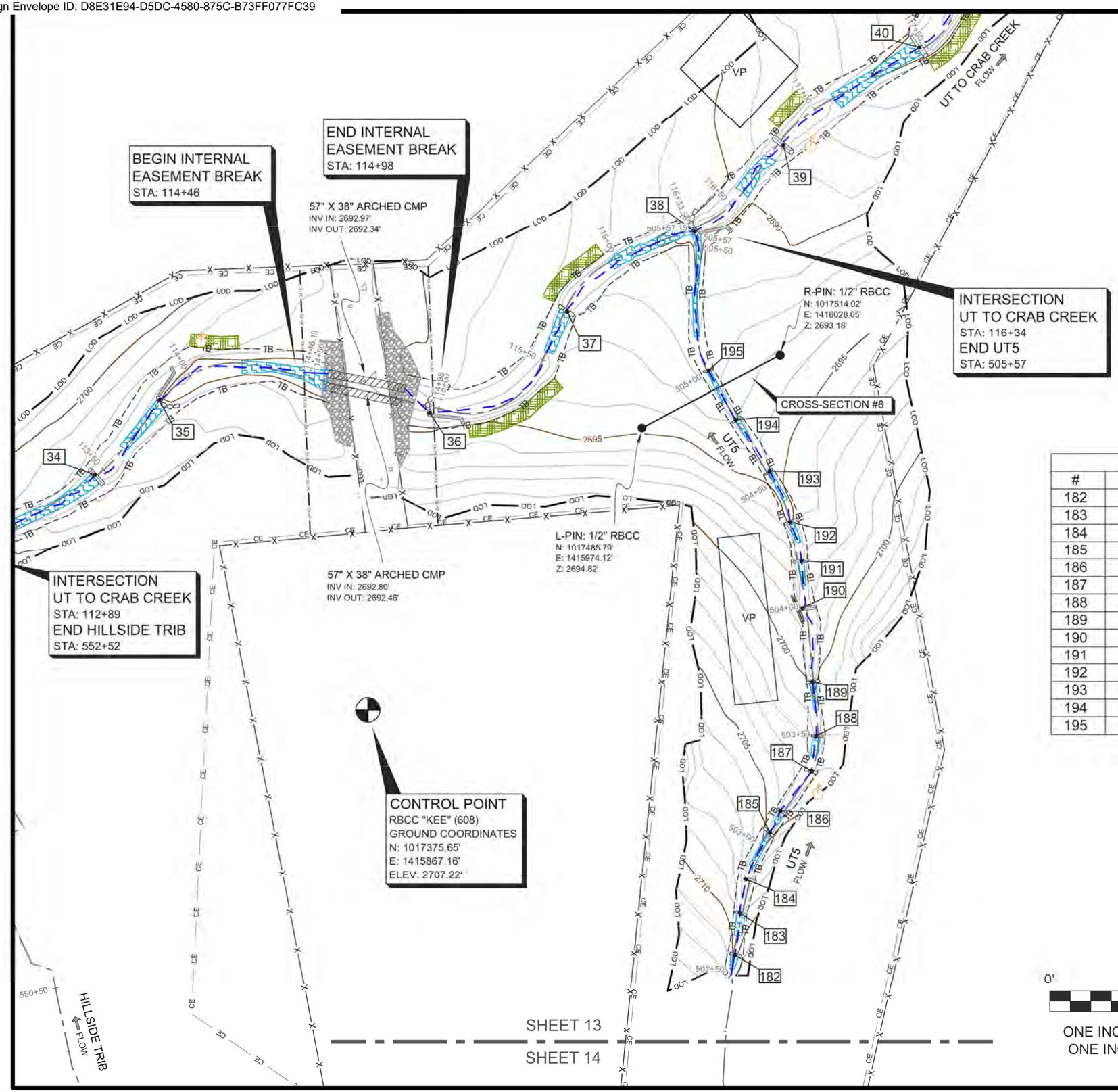

STRUCTURE TABLE-UT5		
#	DESCRIPTION	ELEVATION
182	LOG SILL	2710.30
183	LOG SILL	2708.94
184	LOG SILL	2706.62
185	ROCK SILL	2704.38
186	LOG SILL	2703.49
187	ROCK SILL	2701.92
188	LOG SILL	2701.01
189	ROCK SILL	2699.58
190	LOG SILL	2697.38
191	LOG SILL	2696.45
192	LOG SILL	2695.34
193	LOG SILL	2694.05
194	ROCK SILL	2692.36
195	LOG SILL	2691.34

0' 40' 80' 120'

ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SEAL:
NORTH CAROLINA PROFESSIONAL LAND SURVEYOR L-4647 PHILLIP B. KEE
DocuSigned by:
D96500AA7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
UT5

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:
13 OF 32

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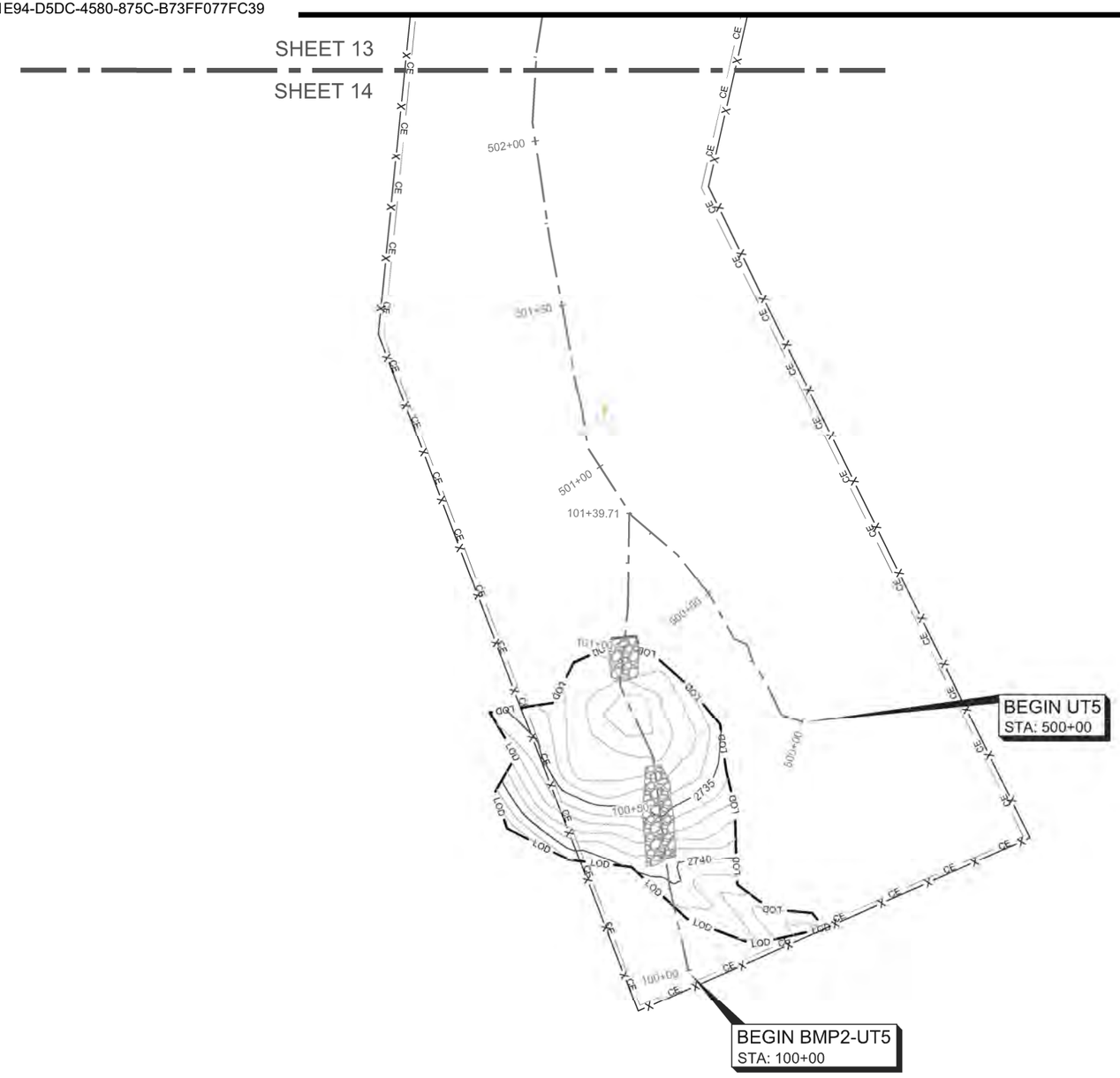
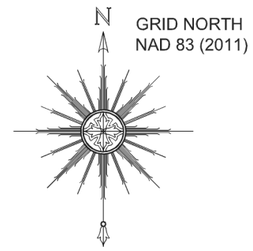


STRUCTURE TABLE-UT5		
#	DESCRIPTION	ELEVATION
182	LOG SILL	2710.30
183	LOG SILL	2708.94
184	LOG SILL	2706.62
185	ROCK SILL	2704.38
186	LOG SILL	2703.49
187	ROCK SILL	2701.92
188	LOG SILL	2701.01
189	ROCK SILL	2699.58
190	LOG SILL	2697.38
191	LOG SILL	2696.45
192	LOG SILL	2695.34
193	LOG SILL	2694.05
194	ROCK SILL	2692.36
195	LOG SILL	2691.34



0' 40' 80' 120'

ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D9650041A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
UT5
BMP2

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:
14 OF 32

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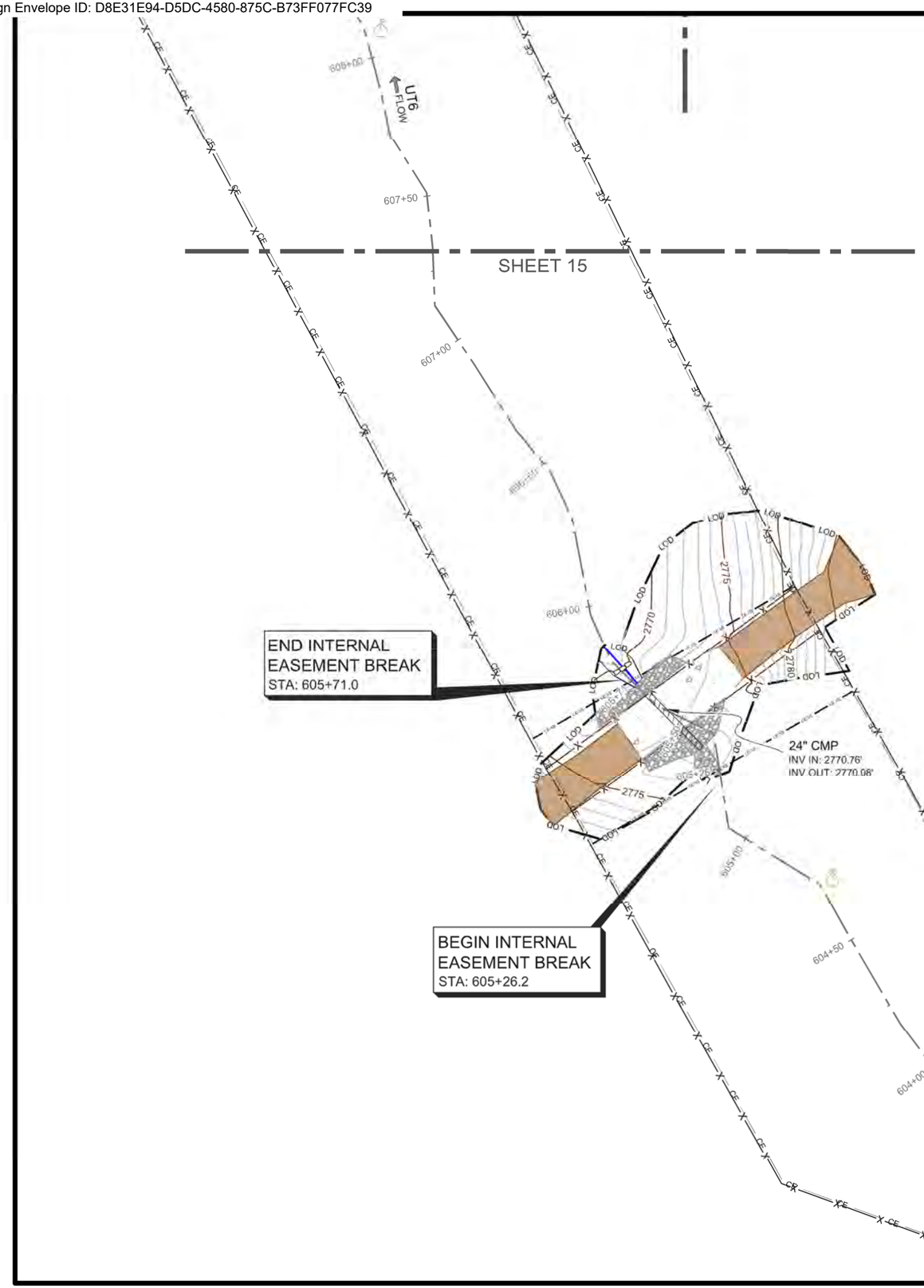

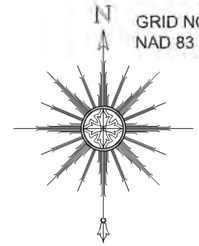

0' 40' 80' 120'

ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

STRUCTURE TABLE-UT5		
#	DESCRIPTION	ELEVATION
182	LOG SILL	2710.30
183	LOG SILL	2708.94
184	LOG SILL	2706.62
185	ROCK SILL	2704.38
186	LOG SILL	2703.49
187	ROCK SILL	2701.92
188	LOG SILL	2701.01
189	ROCK SILL	2699.58
190	LOG SILL	2697.38
191	LOG SILL	2696.45
192	LOG SILL	2695.34
193	LOG SILL	2694.05
194	ROCK SILL	2692.36
195	LOG SILL	2691.34

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D96500467692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
UT6
PERMANENT CULVERT CROSSING 3

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:
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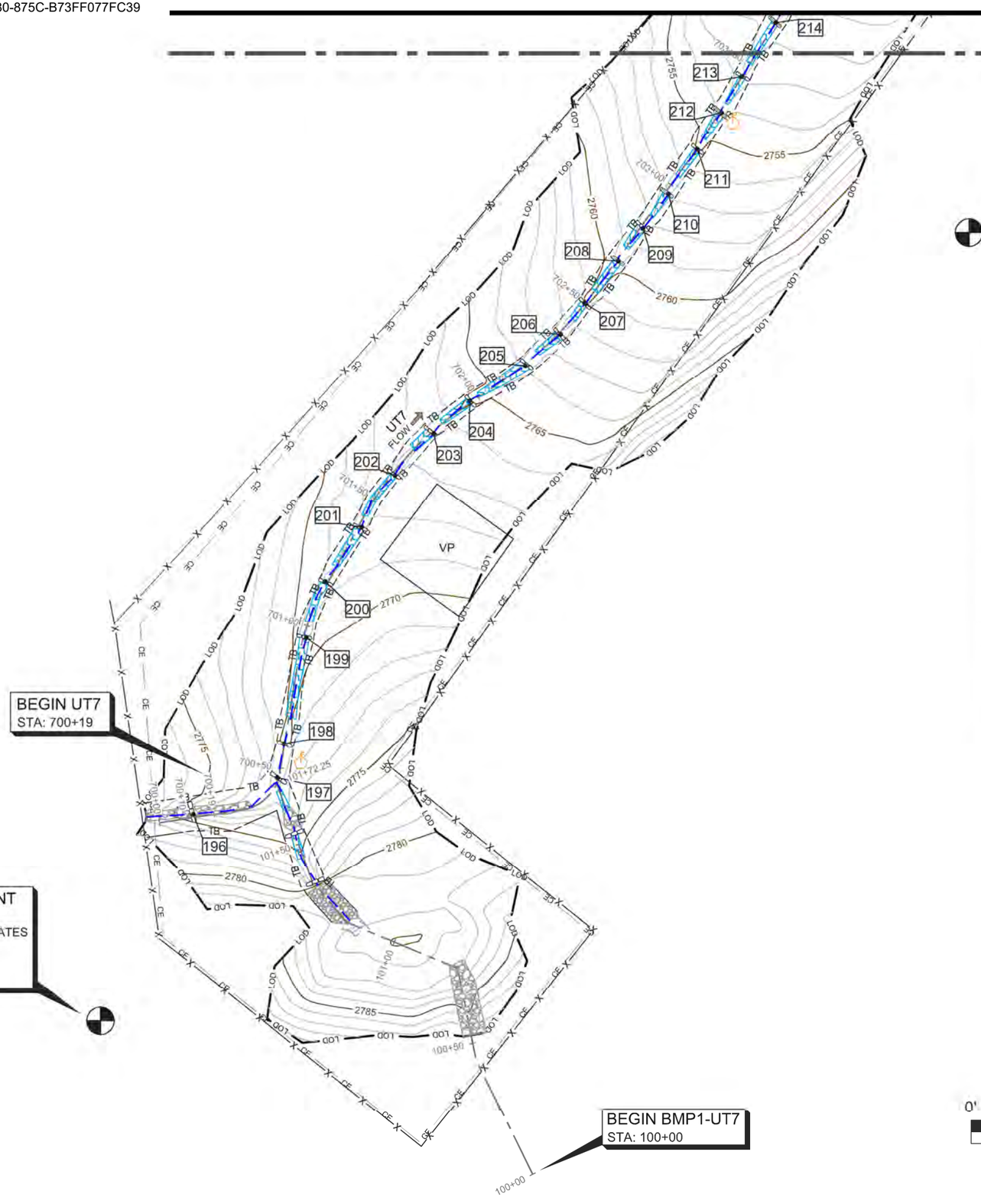

STRUCTURE TABLE-UT7		
#	DESCRIPTION	ELEVATION
196	ROCK SILL	2773.70
197	ROCK SILL	2770.62
198	ROCK SILL	2770.42
199	ROCK SILL	2769.08
200	ROCK SILL	2768.52
201	ROCK SILL	2767.68
202	ROCK SILL	2766.81
203	ROCK SILL	2765.85
204	ROCK SILL	2764.78
205	ROCK SILL	2763.22
206	ROCK SILL	2761.72
207	ROCK SILL	2760.65
208	LOG SILL	2758.98
209	ROCK SILL	2757.73
210	LOG SILL	2756.46
211	ROCK SILL	2754.78
212	LOG SILL	2753.59
213	ROCK SILL	2752.19

ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D965004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
UT7 & UT7-BMP1
(SEE SHEET 2 FOR UT7 INT W/ UT TO CRAB CREEK)

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:
16 OF 32

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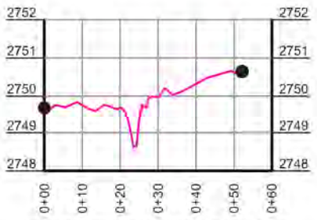
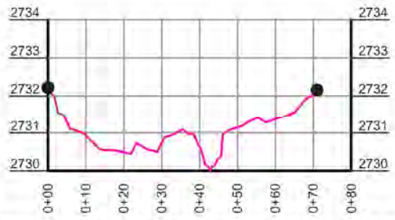
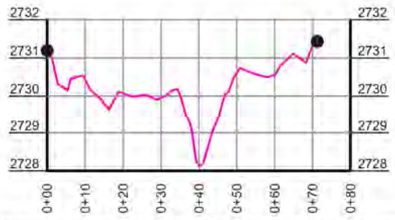


CROSS-SECTION #1 -UT7
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



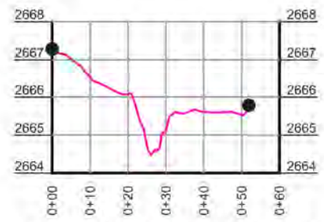
CROSS-SECTION #2 -UT TO CRAB CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



CROSS-SECTION #3 -UT TO CRAB CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

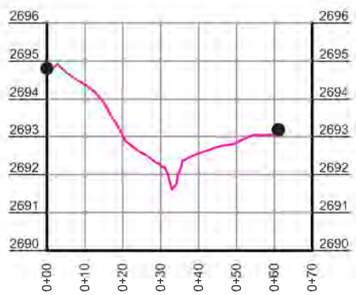
CROSS-SECTION #4 -UT TO CRAB CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

CROSS-SECTION #5 -UT TO CRAB CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

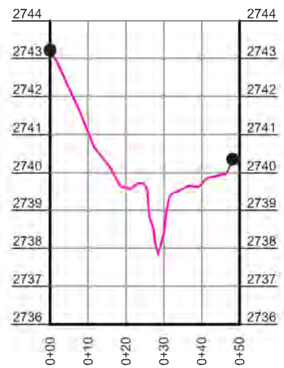


CROSS-SECTION #6 -UT TO CRAB CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

CROSS-SECTION #7 -UT TO CRAB CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



CROSS-SECTION #8 -UT5
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



CROSS-SECTION #9 -UT4
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

● CROSS-SECTION REBAR

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4907 SURVEYOR PHILIP B. KEE

DocuSigned by:
D965004A769240F...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
CROSS-SECTIONS # 1-9

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:
17 OF 32

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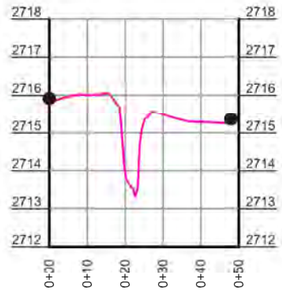
CROSS-SECTION #10 -UT4

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

CROSS-SECTION #11 -UT4

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



CROSS-SECTION #12 -UT4

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

CROSS-SECTION #13 -UT1A

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

CROSS-SECTION #14 -UT1A

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

● CROSS–SECTION REBAR

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D665004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
CROSS-SECTIONS# 10-14

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081–AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:
18 OF 32

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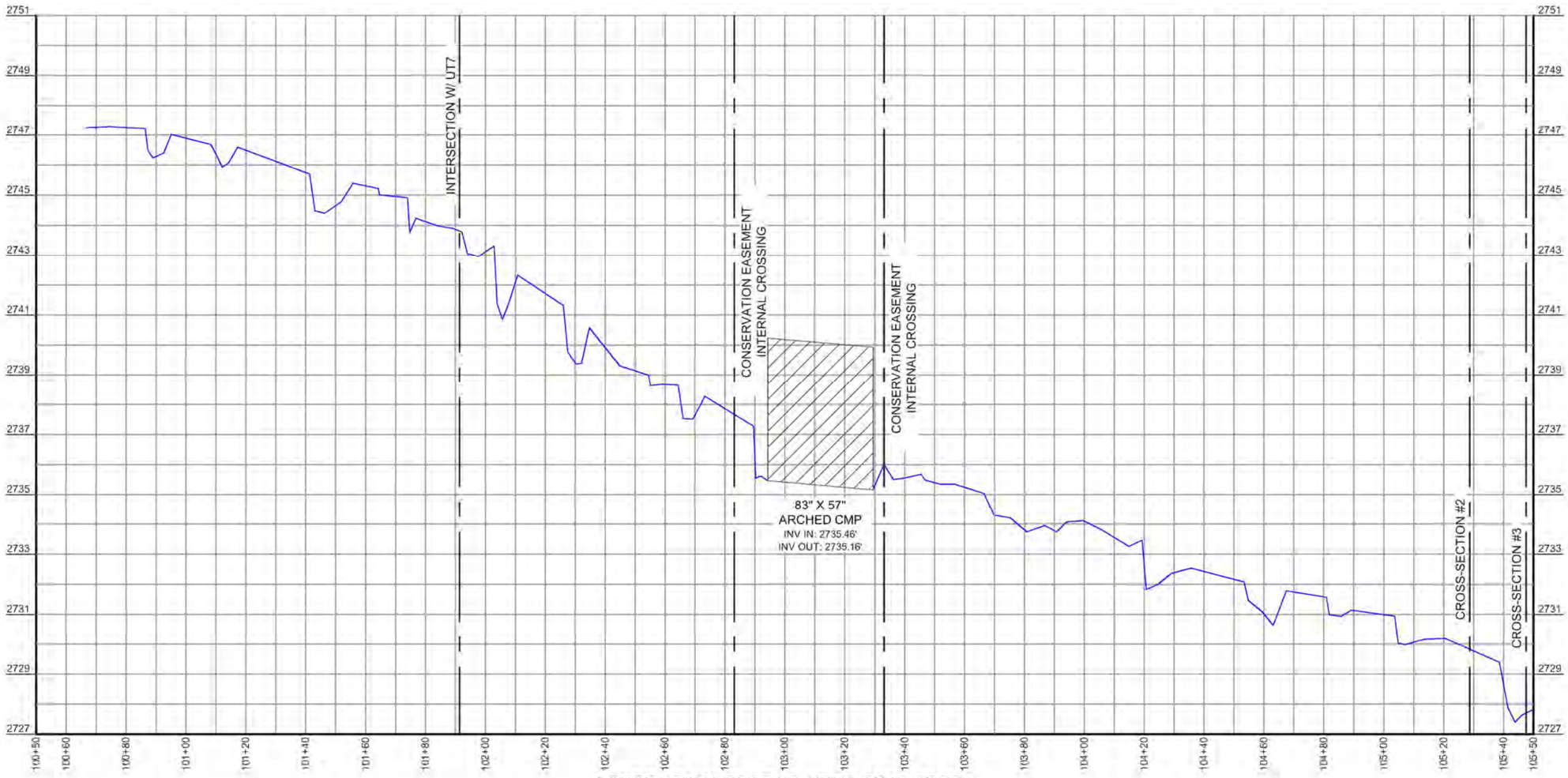

LONGITUDINAL PROFILE- UT TO CRAB CREEK

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE

VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: D985004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88

CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT TO CRAB CREEK STA: 100+50-105+50

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

19 OF 32

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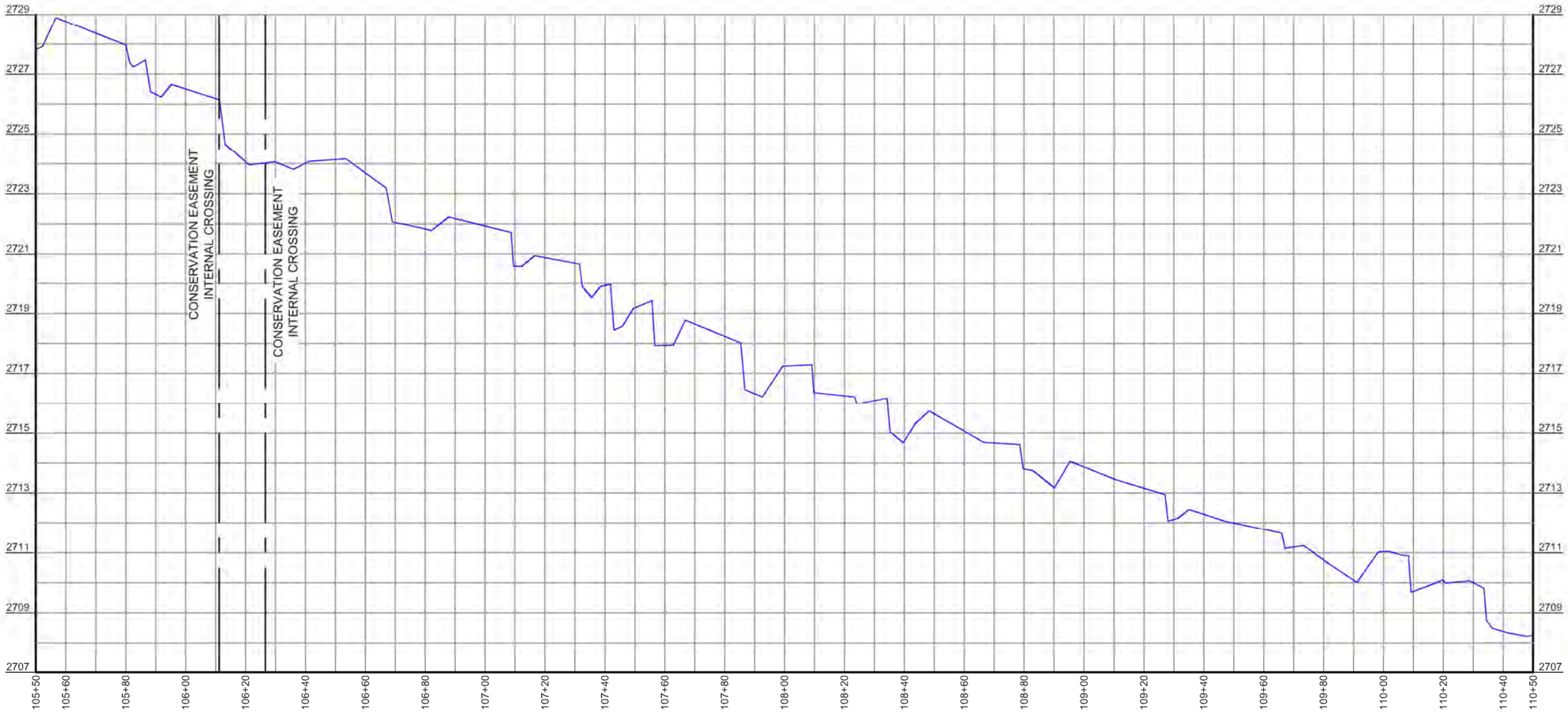

LONGITUDINAL PROFILE- UT TO CRAB CREEK

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE

VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4641 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: D965004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT TO CRAB CREEK STA: 105+50-110+50

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET: 20 OF 32

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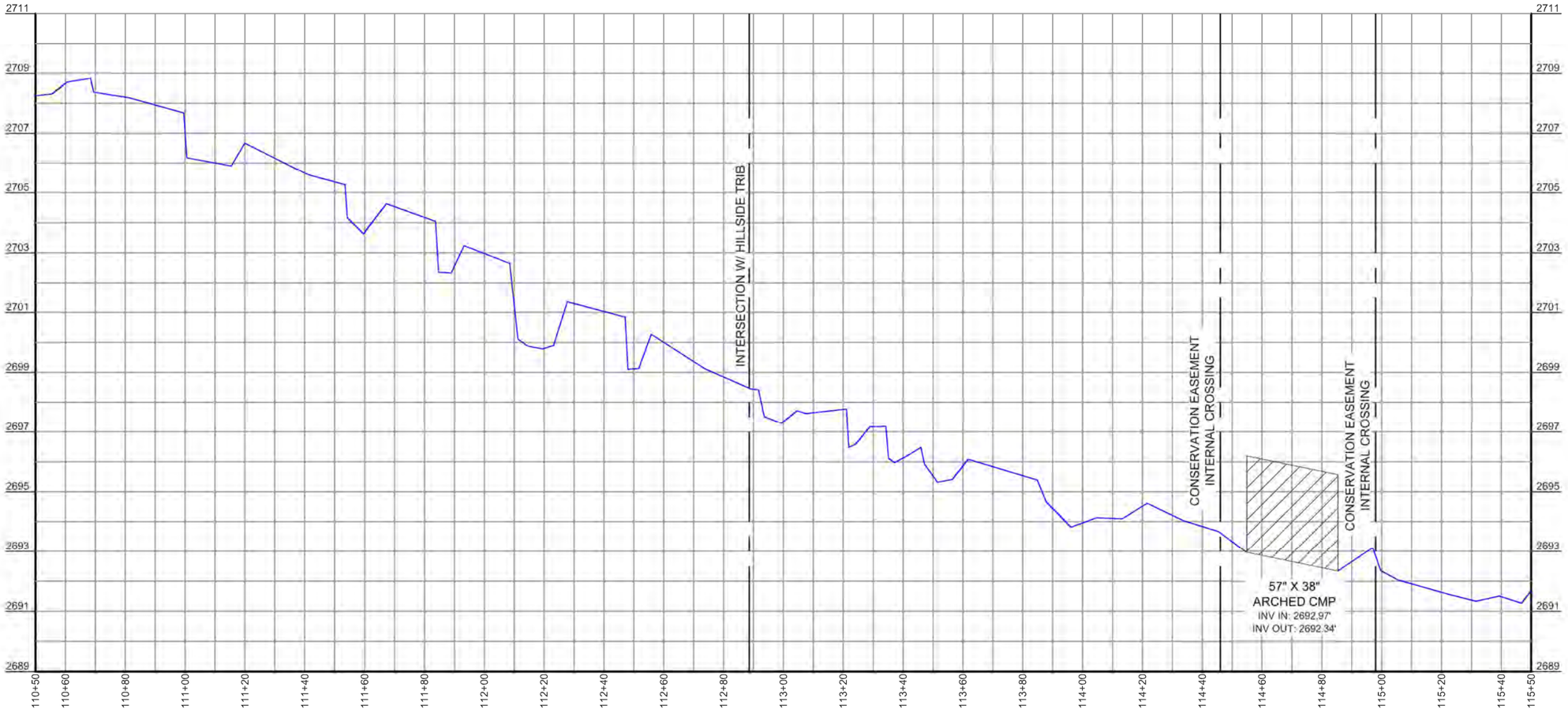

LONGITUDINAL PROFILE- UT TO CRAB CREEK

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE

VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: D9650047A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88

CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT TO CRAB CREEK STA: 110+50-115+50

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

21 OF 32

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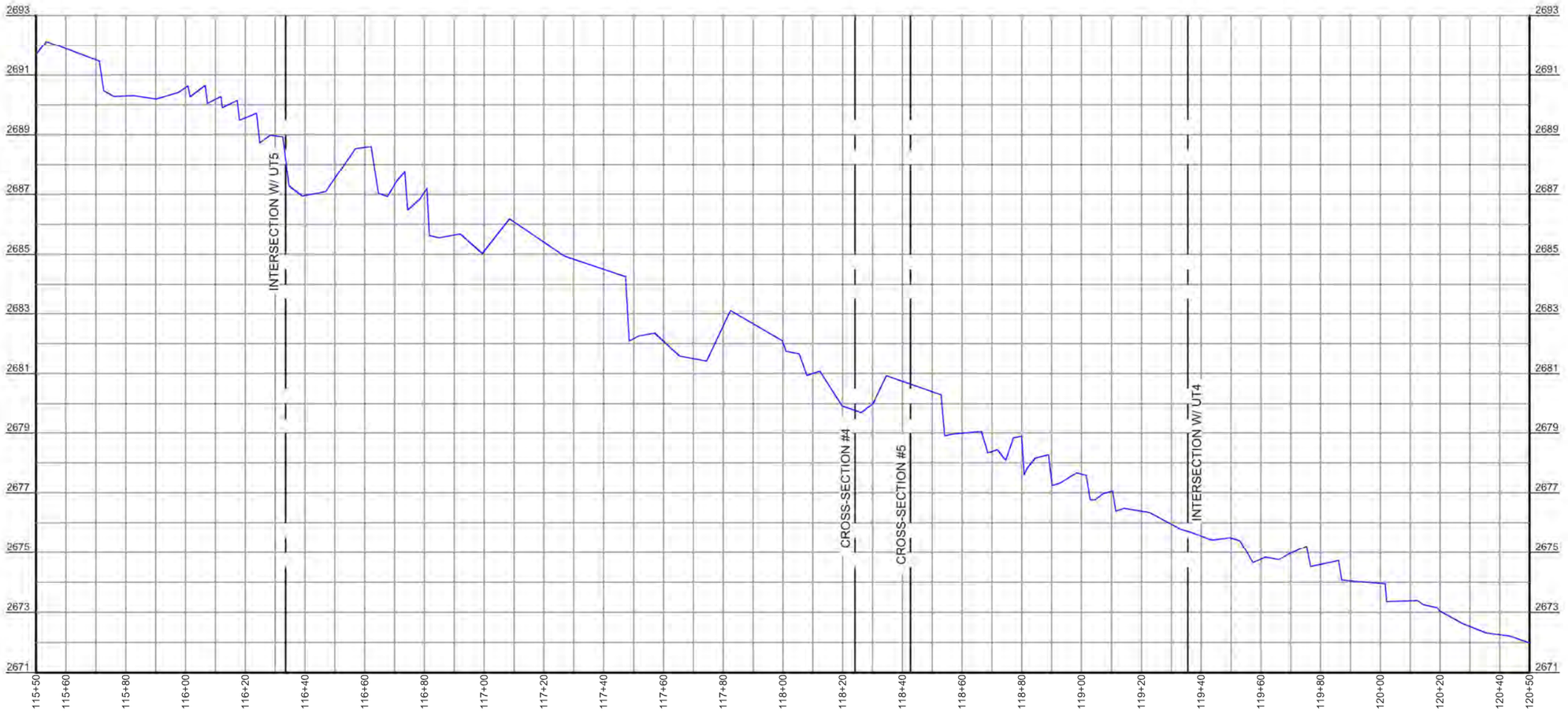

LONGITUDINAL PROFILE- UT TO CRAB CREEK

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE

VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL LAND SURVEYOR PHILIP B. KEE

DocuSigned by:
D965004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT TO CRAB CREEK STA: 115+50-120+50

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

22 OF 32

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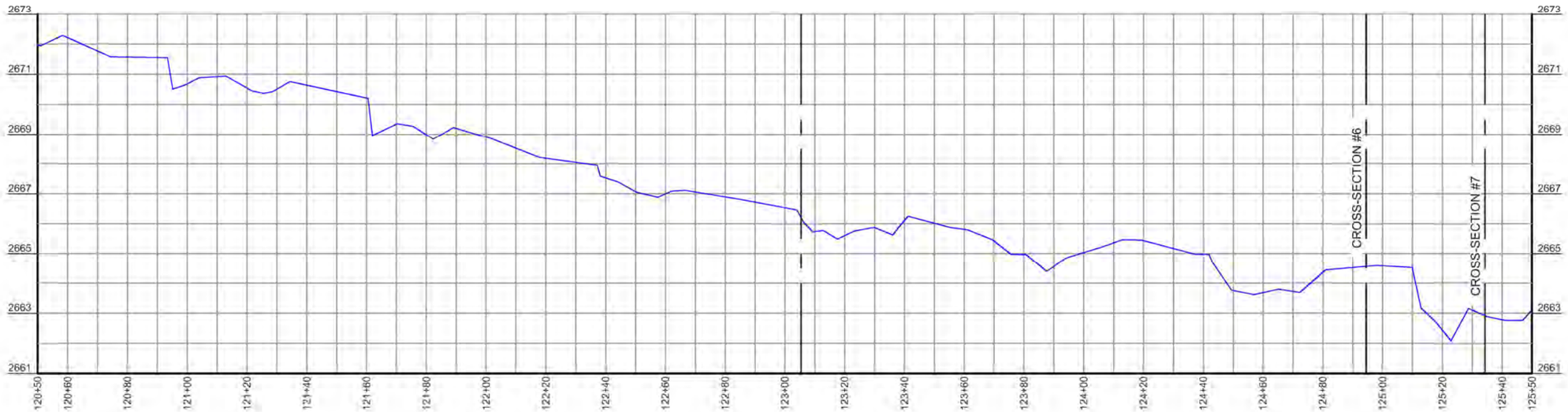

LONGITUDINAL PROFILE- UT TO CRAB CREEK

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE

VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: D96S004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88

CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT TO CRAB CREEK STA: 120+50-130+00

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

23 OF 32

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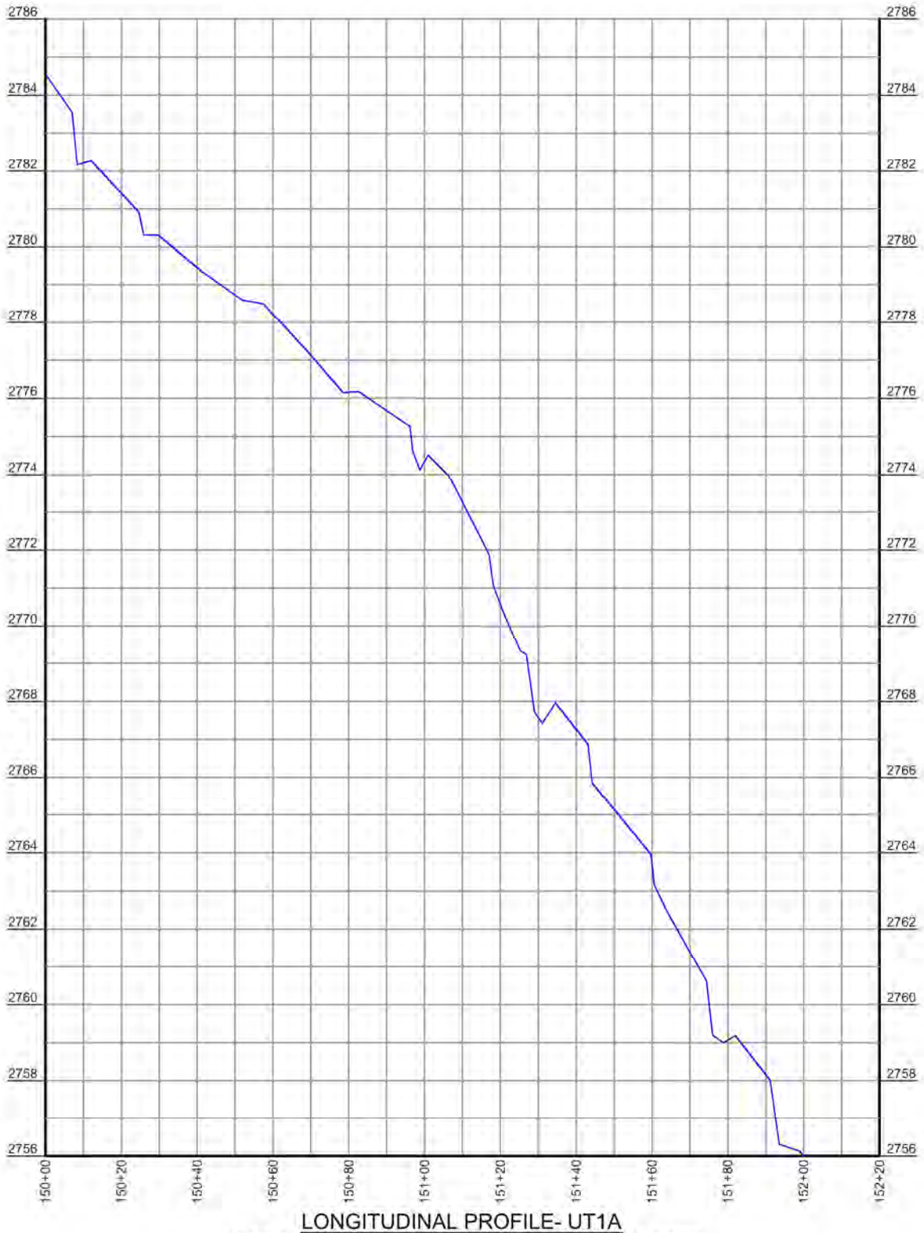
LONGITUDINAL PROFILE- UT1

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG



LONGITUDINAL PROFILE- UT1A

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4041 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D965004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT1 & UT1A STA: 150+00-152+20

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

24 OF 32

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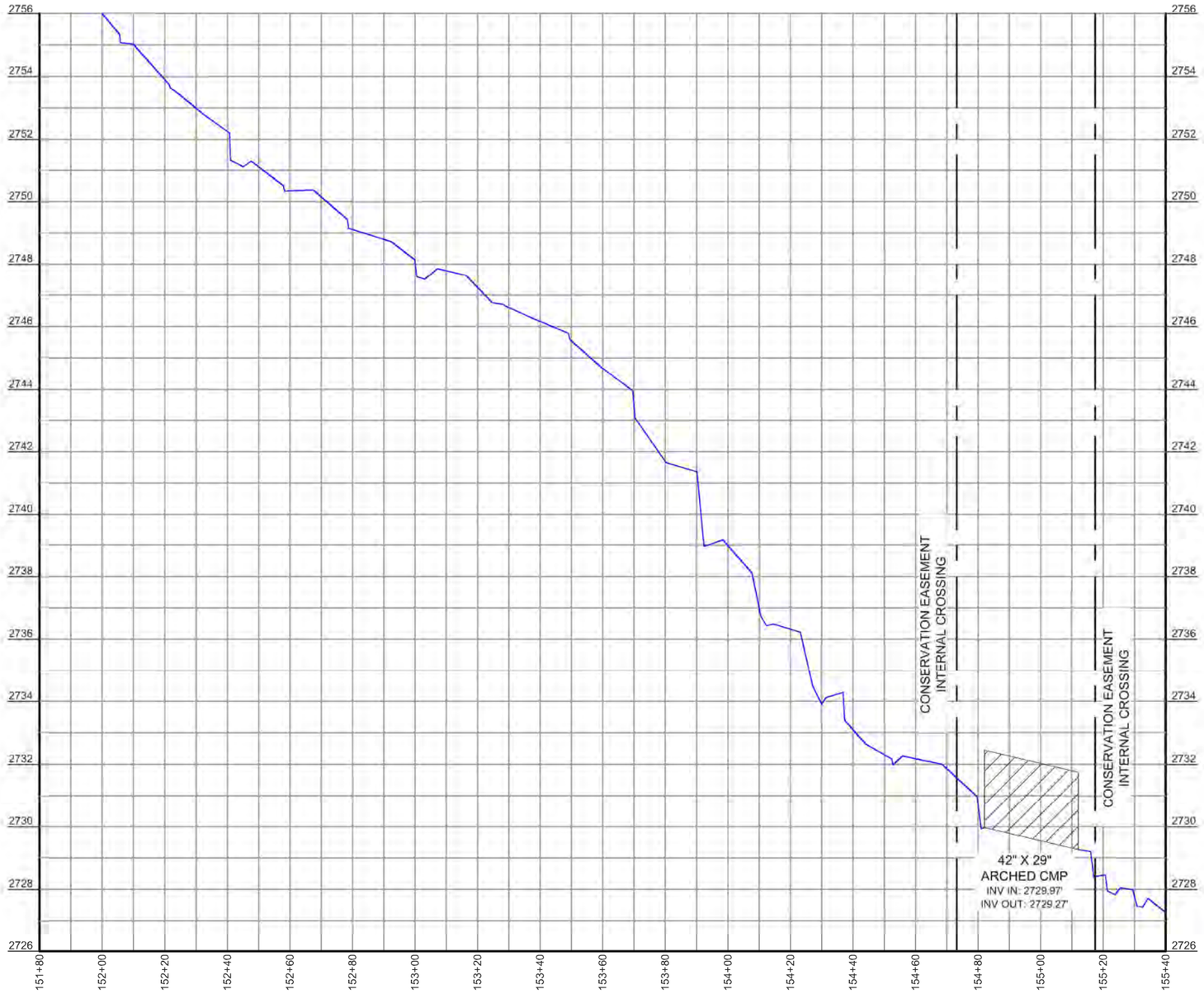

LONGITUDINAL PROFILE- UT1A

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: D9650044692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT1A
STA: 152+20-155+40

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

25 OF 32

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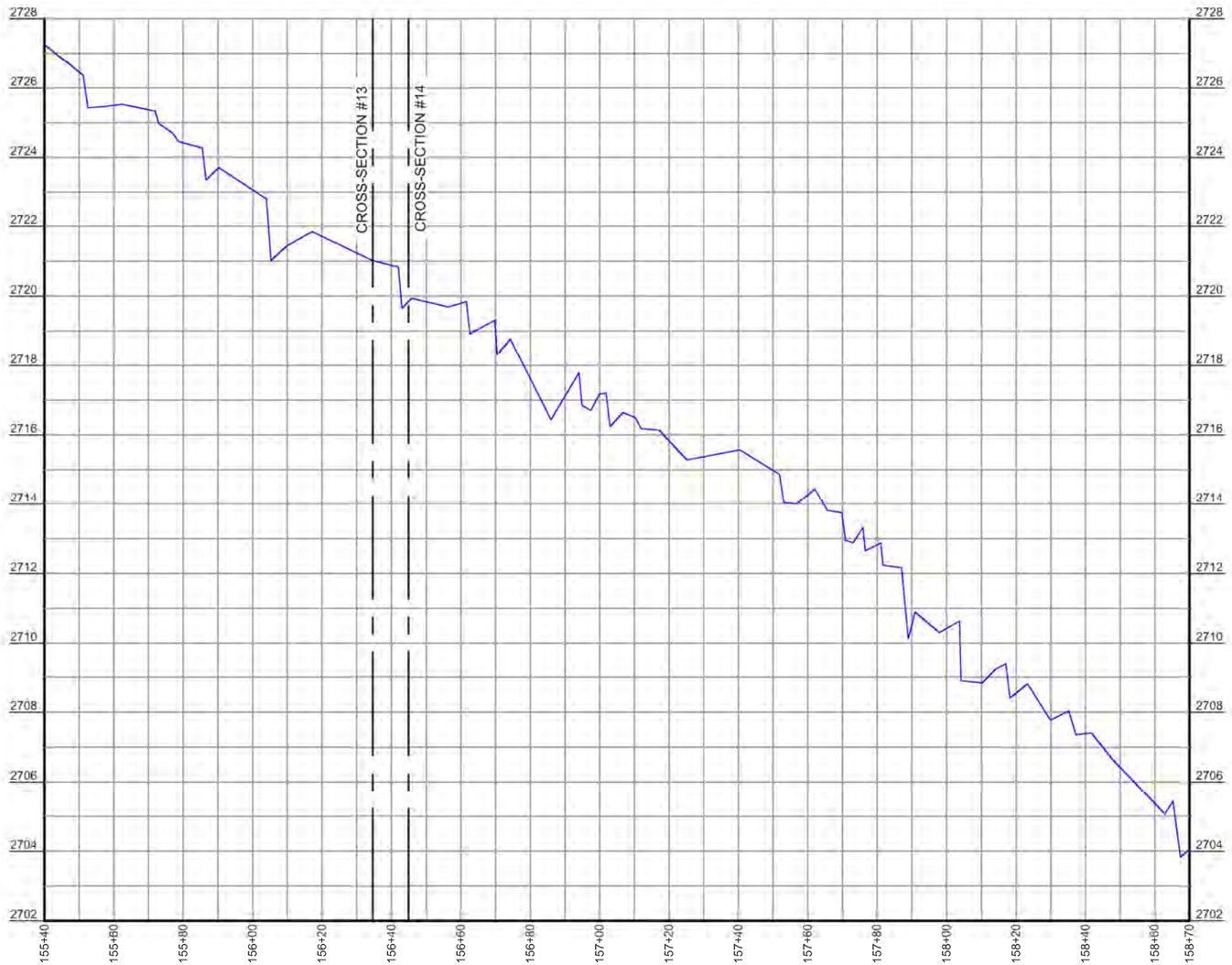

LONGITUDINAL PROFILE- UT1A

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4641 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D965004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:
DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:
LONGITUDINAL PROFILE: UT1A
STA: 155+40-158+70

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:
26 OF 32

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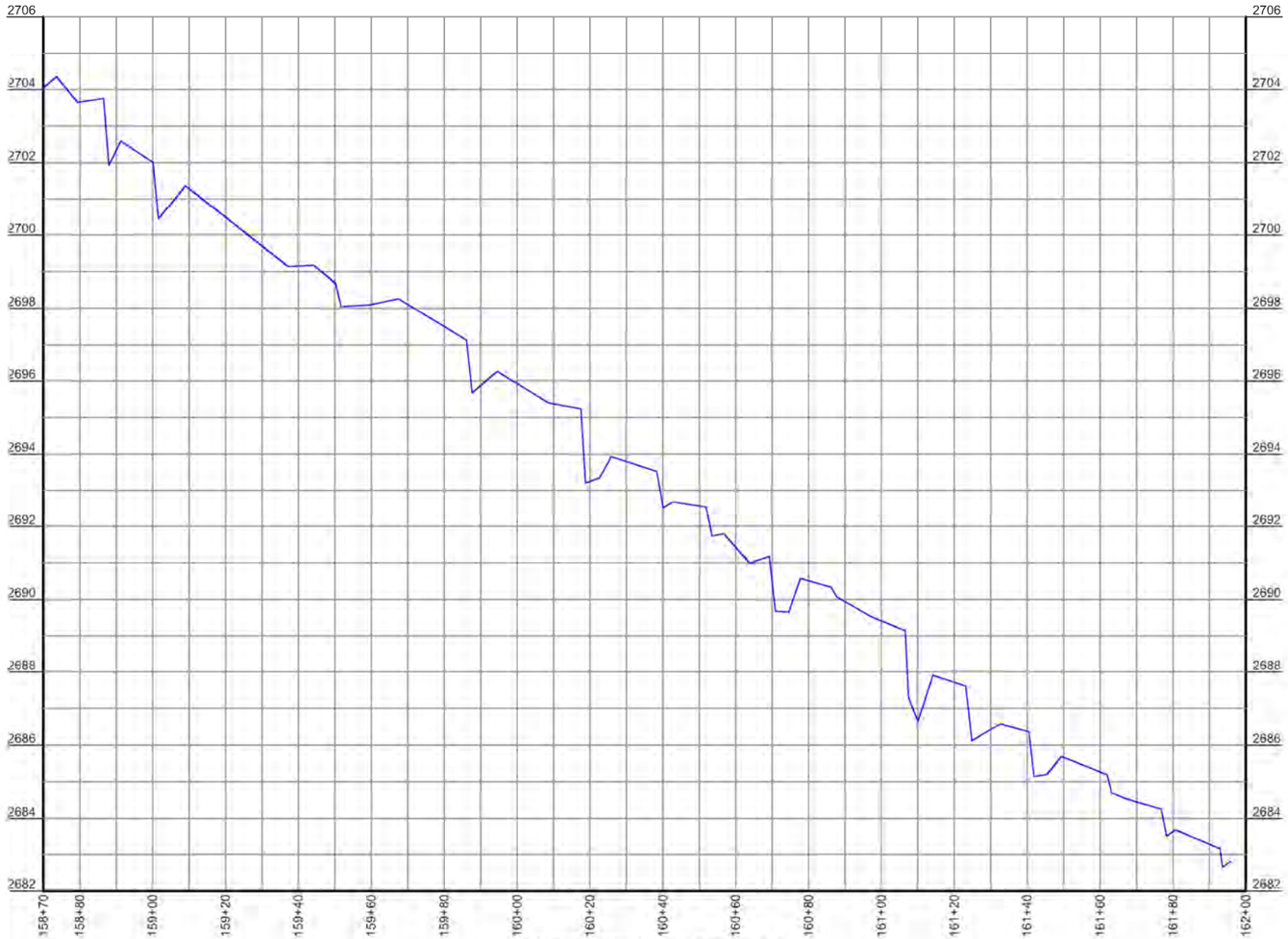

LONGITUDINAL PROFILE- UT1A

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILIP B. KEE

DocuSigned by: P.B. Kee ID965004A7892407

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT1A
STA: 158+70-162+00

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

27 OF 32

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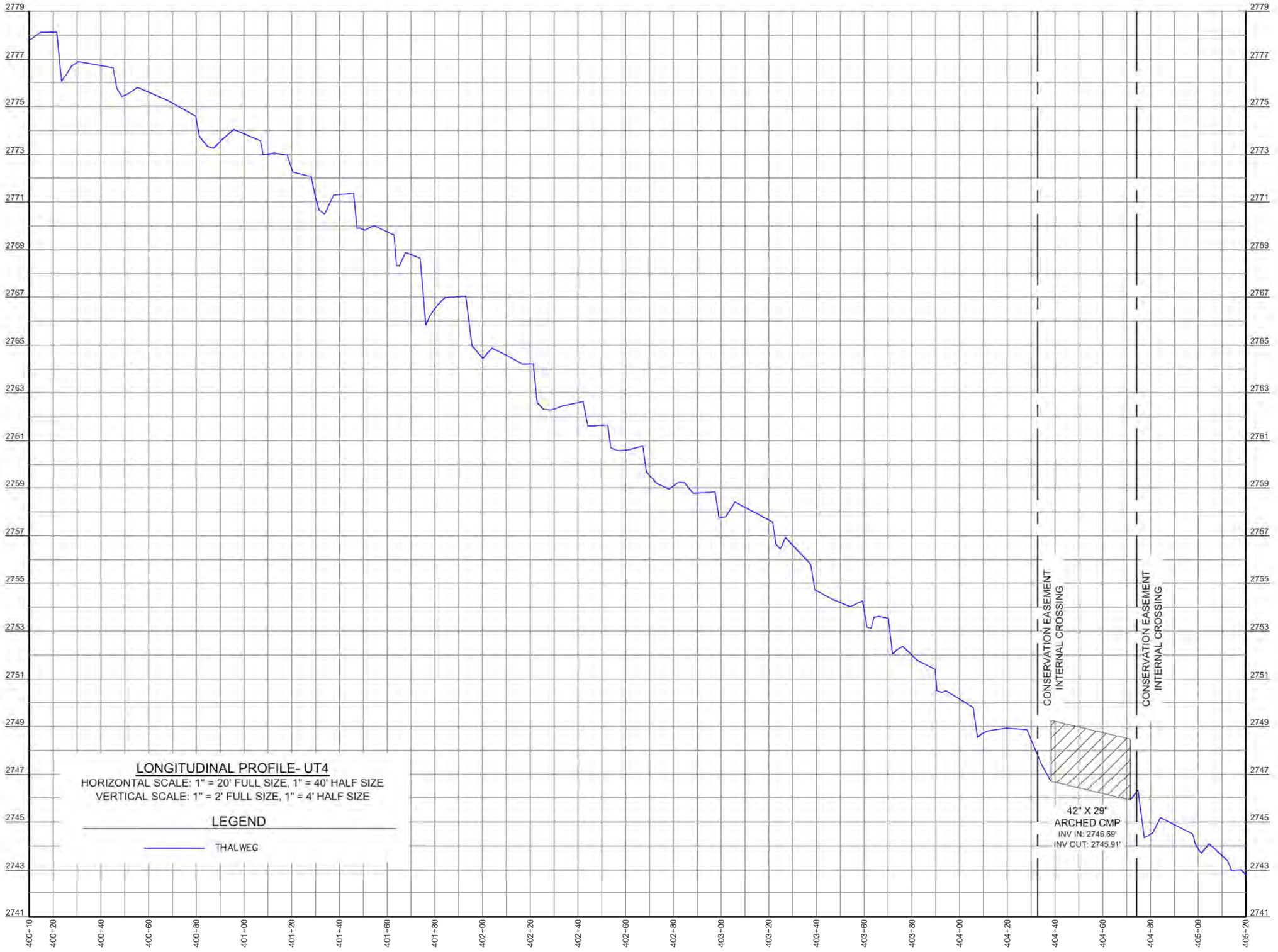

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: L-4647 PBK
D9650044A769240...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT4
STA: 400+10-405+20

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

28 OF 32

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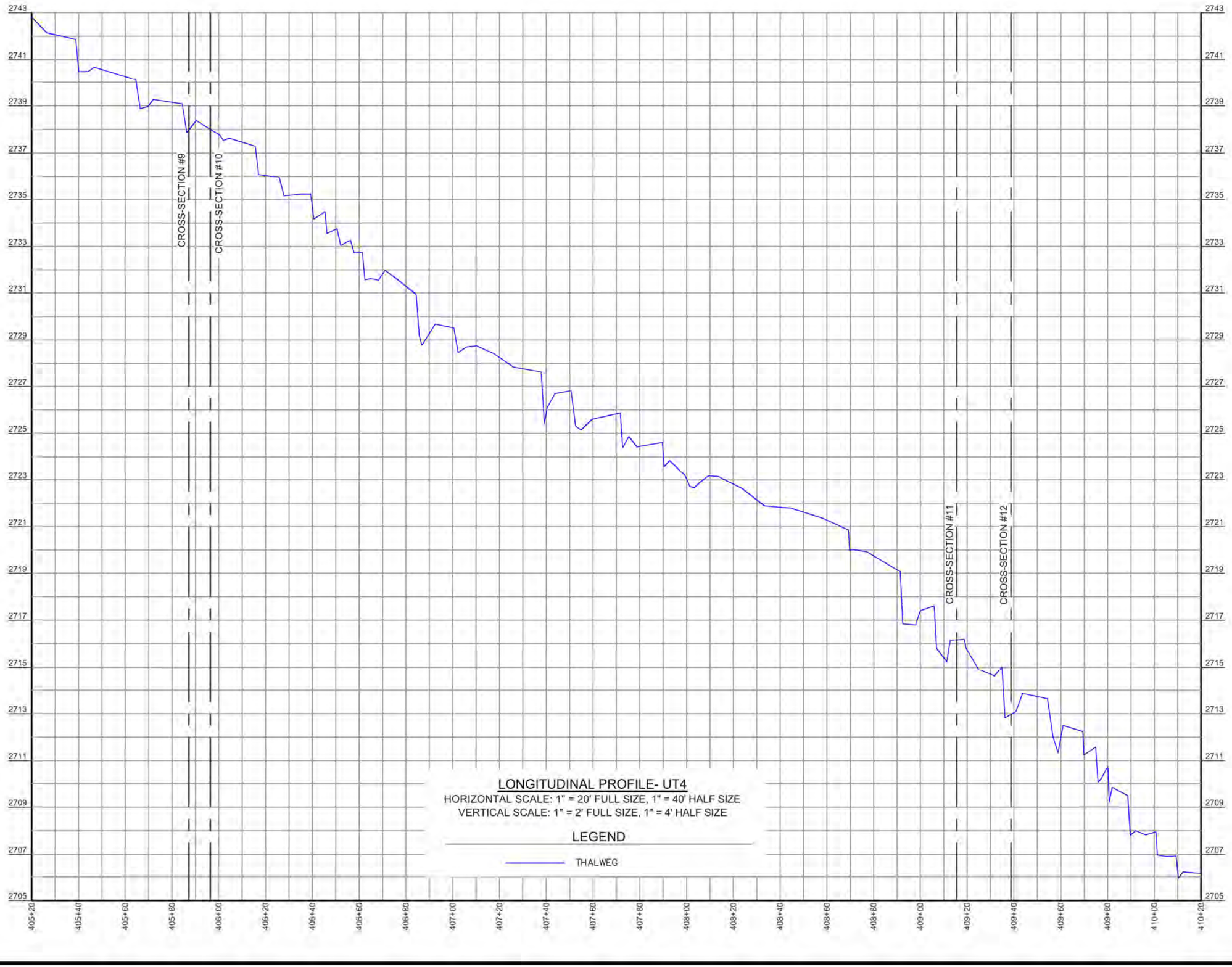

LONGITUDINAL PROFILE- UT4

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE

VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4041 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:

D965004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88

CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT4
STA: 405+20-410+20

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZG, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

29 OF 32

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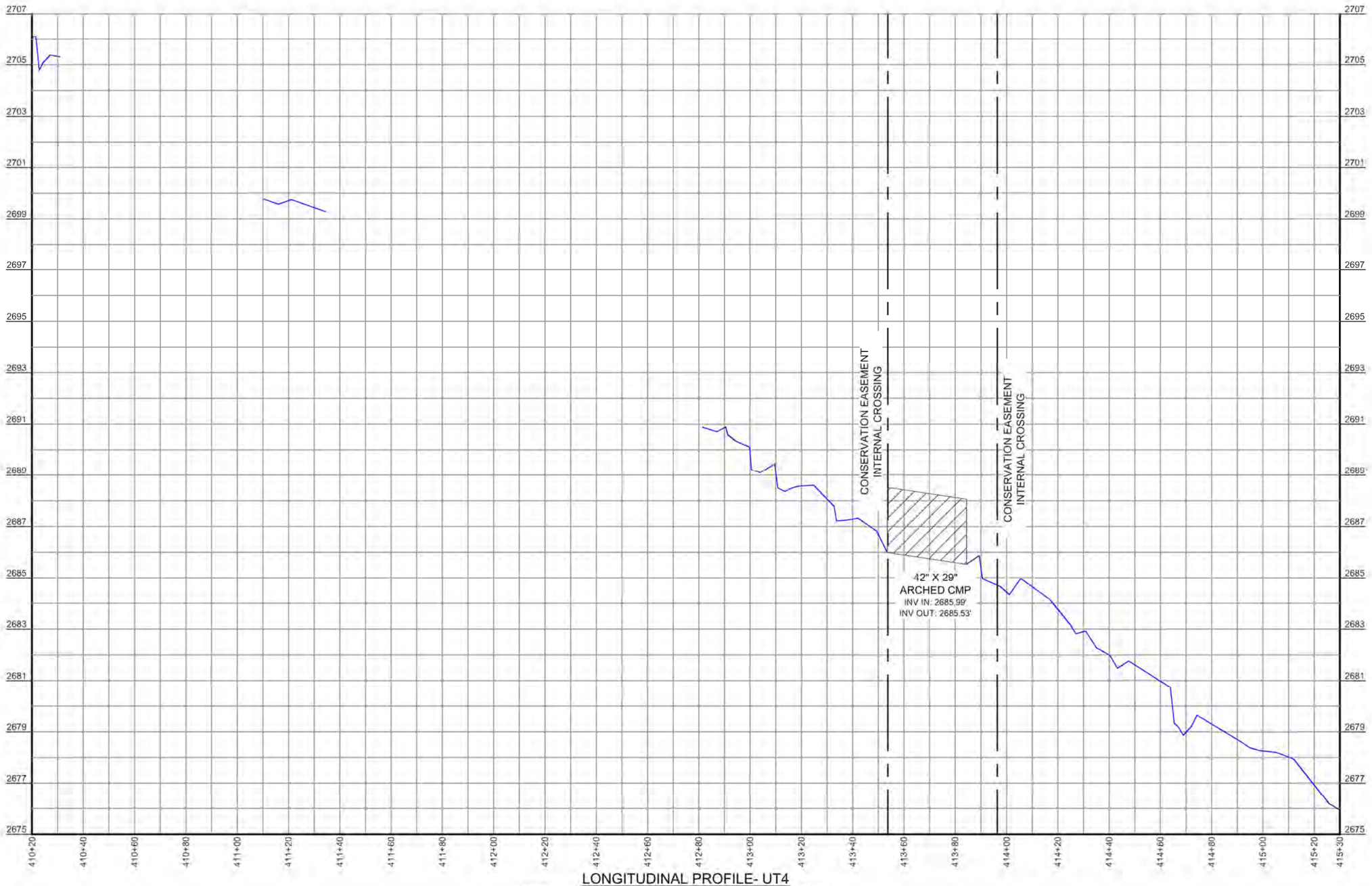

LONGITUDINAL PROFILE- UT4

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by:
D965004A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT4
STA: 410+20-415+30

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

30 OF 32

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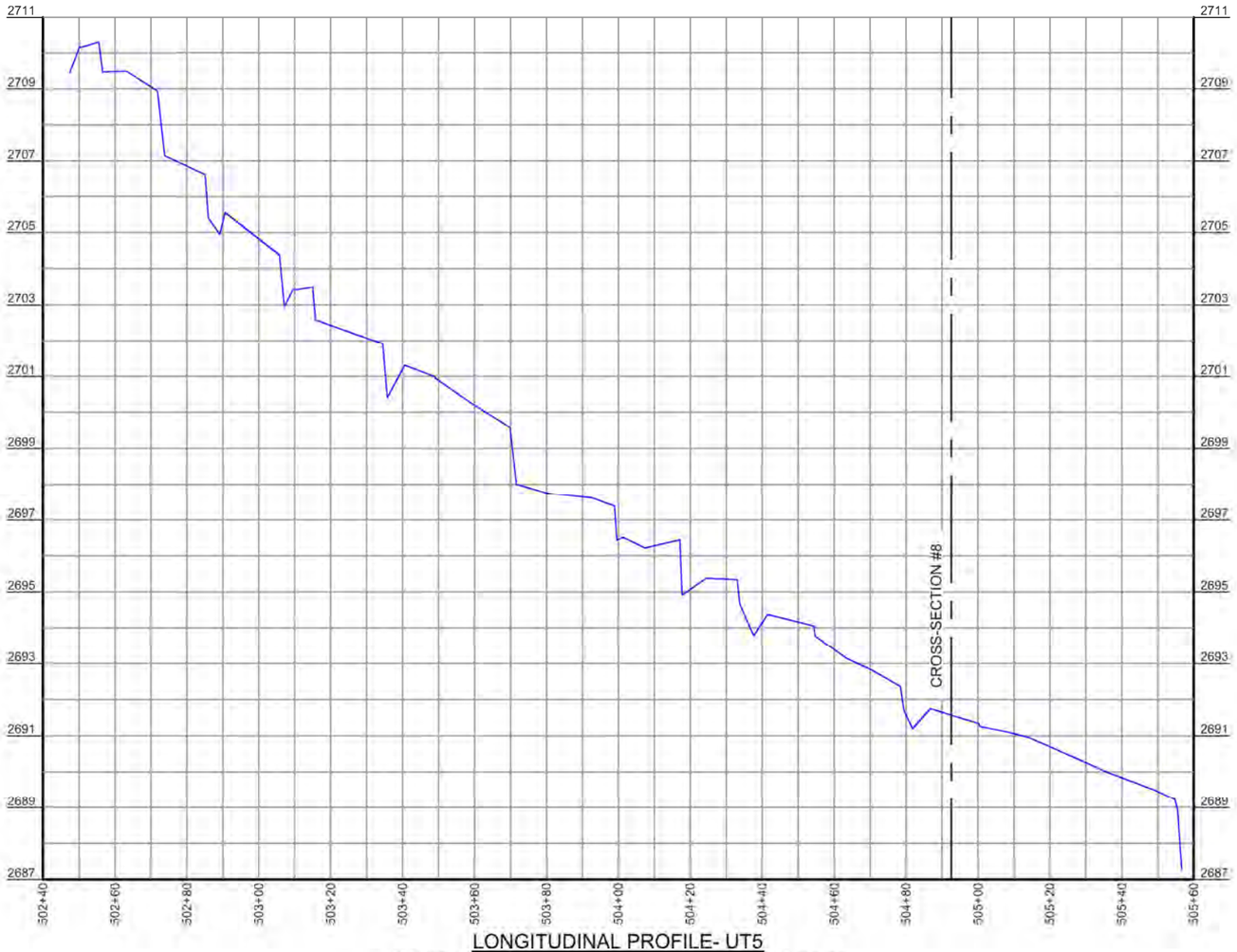

LONGITUDINAL PROFILE- UT5

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE

VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4641 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: [signature] 1D9650044A7692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88

CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT5

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

31 OF 32

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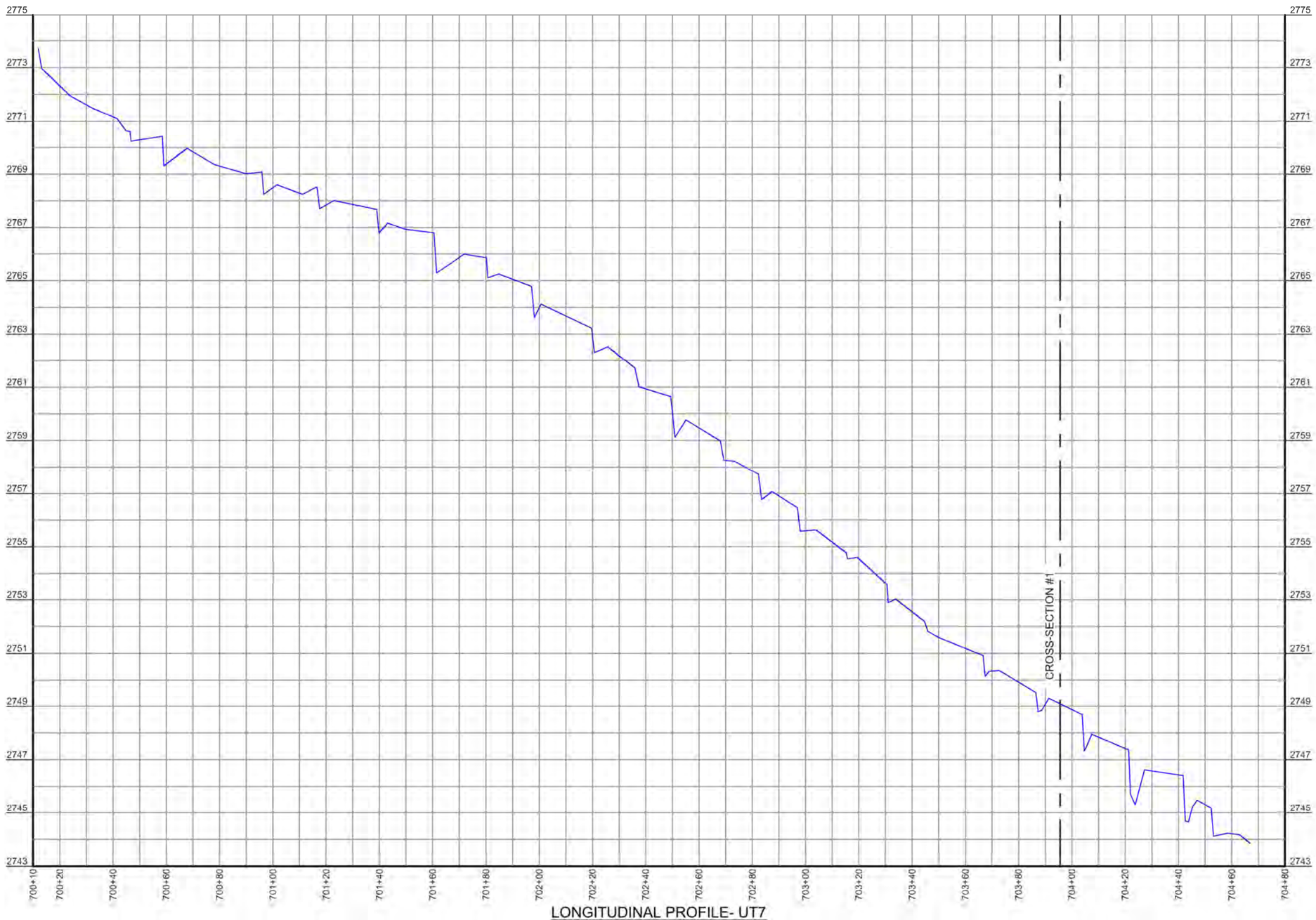

LONGITUDINAL PROFILE- UT7

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE

VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

THALWEG

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4041 LAND SURVEYOR PHILLIP B. KEE

DocuSigned by: D96500047692407...

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:

WILDLANDS ENGINEERING, INC

SPO FILE NOS. 03-FT, 03-FU, 03-FV, 03-FW, 03-FX, 03-FY

DMS SITE ID NO. 100082

PROJECT:

DOUBLE H FARMS MITIGATION SITE

SHEET TITLE:

LONGITUDINAL PROFILE: UT7

TOWNSHIP: GLADE CREEK	COUNTY: ALLEGHANY	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: DD/PBK	SURVEY BY: KP, ZC, CB, DP, SA, NH, AC
SCALE: AS SHOWN	SURVEY DATE: 02/01/22	
JOB: #2109081-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:

32 OF 32

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APPENDIX 5. Agency Correspondence

PLANTING CORRESPONDENCE

Final Mitigation Plan 11.2020

Buffer Planting Zone				
Bare Root				
Species	**Common Name**	**Stratum**	**Wetland Indicator Status**	**% of Stems**
Platanus occidentalis	Sycamore	Canopy	FACW	15%
Diospyros virginiana	Persimmon	Canopy	FAC	10%
Nyssa sylvatica	Blackgum	Canopy	FAC	10%
Ulmus americana	American Elm	Canopy	FACW	10%
Oxydendrum arboreum	Sourwood*	Subcanopy	UPL	5%
Quercus rubra	Northern Red Oak	Canopy	FACU	10%
Asimina triloba	Pawpaw*	Subcanopy	FAC	5%
Malus angustifolia	Southern Crabapple*	Subcanopy	UPL	5%
Prunus serotina	Black Cherry	Canopy	FACU	10%
Acer negundo	Boxelder	Canopy	FAC	10%
Quercus alba	White Oak	Canopy	UPL	10%
				100%

Proposed 8.4.2021

Buffer Planting Zone				
Bare Root				
Species	**Common Name**	**Stratum**	**Wetland Indicator Status**	**% of Stems**
Platanus occidentalis	Sycamore	Canopy	FACW	15%
Diospyros virginiana	Persimmon	Canopy	FAC	10%
Carpinus caroliniana	Ironwood	Canopy	FAC	5%
Betula lenta	Sweet Birch	Canopy	FACU	10%
Oxydendrum arboreum	Sourwood*	Subcanopy	UPL	5%
Magnolia acuminata	Cucumber Magnolia	Canopy	FACU	10%
Quercus rubra	Northern Red Oak	Canopy	FACU	10%
Asimina triloba	Pawpaw*	Subcanopy	FAC	5%
Euonymus americanus	Strawberrybush*	Subcanopy	FAC	5%
Malus angustifolia	Southern Crabapple	Canopy	UPL	0%
Prunus serotina	Black Cherry	Canopy	FACU	10%
Liriodendron tulipifera	Tulip Poplar	Canopy	FACU	5%
Quercus alba	White Oak	Canopy	UPL	10%
				100%

Preferred substitutes to this plant list include *Tilia americana* , *Aesculus flava* , *Halesia tetraptera* , and *Betula nigra* .

*indicates species that will be omitted from the average height calculation

FINAL Approved by IRT 8.18.2021

Buffer Planting Zone				
Bare Root				
Species	**Common Name**	**Stratum**	**Wetland Indicator Status**	**% of Stems**
Platanus occidentalis	Sycamore	Canopy	FACW	15%
Diospyros virginiana	Persimmon	Canopy	FAC	10%
Carpinus caroliniana	Ironwood	Canopy	FAC	5%
Betula lenta	Sweet Birch	Canopy	FACU	10%
Oxydendrum arboreum	Sourwood*	Subcanopy	UPL	5%
Magnolia acuminata	Cucumber Magnolia	Canopy	FACU	10%
Quercus rubra	Northern Red Oak	Canopy	FACU	10%
Asimina triloba	Pawpaw*	Subcanopy	FAC	5%
Euonymus americanus	Strawberrybush*	Subcanopy	FAC	5%
Prunus serotina	Black Cherry	Canopy	FACU	10%
Liriodendron tulipifera	Tulip Poplar	Canopy	FACU	5%
Quercus alba	White Oak	Canopy	UPL	10%
				100%

Preferred substitutes to this plant list include *Tilia americana* , *Aesculus flava* , and *Halesia tetraptera.*

*indicates species that will be omitted from the average height calculation

Final Mitigation Plan 11.2020

Wetland Planting Zone				
Bare Root				
Species	**Common Name**	**Stratum**	**Wetland Indicator Status**	**% of Stems**
Platanus occidentalis	Sycamore	Canopy	FACW	20%
Diospyros virginiana	Persimmon	Canopy	FAC	8%
Asimina triloba	Pawpaw	Subcanopy	FAC	8%
Acer negundo	Boxelder	Canopy	FAC	15%
Alnus serrulata	Tag Alder*	Shrub	OBL	10%
Euonymus americanus	Strawberrybush*	Shrub	FAC	5%
Fraxinus pennsylvanica	Green Ash	Canopy	FACU	5%
Ulmus americana	American Elm	Canopy	FACW	11%
Nyssa sylvatica	Blackgum	Canopy	FAC	8%
Salix nigra	Black Willow	Canopy	OBL	10%
				100%

Note: Wetland zone species to be planted on 6' spacing in rows spaced 12'

Proposed 8.4.2021

Wetland Planting Zone				
Bare Root				
Species	**Common Name**	**Stratum**	**Wetland Indicator Status**	**% of Stems**
Platanus occidentalis	Sycamore	Canopy	FACW	20%
Betula nigra	River Birch	Canopy	FACW	20%
Acer negundo	Boxelder	Canopy	FAC	10%
Alnus serrulata	Tag Alder*	Shrub	OBL	5%
Euonymus americanus	Strawberrybush*	Shrub	FAC	5%
Liriodendron tulipifera	Tulip Poplar	Canopy	FACU	
Ulmus americana	American Elm	Canopy	FACW	10%
Physocarpus opulifolius	Ninebark*	Shrub	FACW	5%
Carpinus caroliniana	Ironwood	Canopy	FAC	5%
Live Stake				
Salix sericea	Silky Willow	Canopy	OBL	*10%*
Salix nigra	Black Willow	Canopy	OBL	10%
				100%

*indicates species that will be omitted from the average height calculation

The small proposed change removes a FACU species and increases the planting rate of a common species found in the target plant communitiy to 5%. We also corrected a common name error to avoid confusion- *Carpinus carolinian* a is now listed as ironwood as it appears in the riparian buffer plant list.

FINAL Approved by IRT 8.18.2021

Wetland Planting Zone				
Bare Root				
Species	**Common Name**	**Stratum**	**Wetland Indicator Status**	**% of Stems**
Platanus occidentalis	Sycamore	Canopy	FACW	20%
Betula nigra	River Birch	Canopy	FACW	10%
Acer negundo	Boxelder	Canopy	FAC	10%
Alnus serrulata	Tag Alder*	Shrub	OBL	10%
Euonymus americanus	Strawberrybush*	Shrub	FAC	5%
Lindera benzoin	Spicebush*	Shrub	FAC	5%
Sambucus canadensis	Elderberry*	Shrub	FACW	5%
Physocarpus opulifolius	Ninebark*	Shrub	FACW	5%
Carpinus caroliniana	Ironwood	Canopy	FAC	5%
Live Stake				
Salix sericea	Silky Willow	Canopy	*OBL*	*10%*
Salix nigra	Black Willow	Canopy	OBL	15%
				100%

*indicates species that will be omitted from the average height calculation

Ella Wickliff

From: Christine Blackwelder
Sent: Monday, February 14, 2022 9:49 AM
To: Ella Wickliff
Subject: FW: [External] RE: Double H Planting Revision.JL.7.2021 (002).xlsx
Attachments: Double H Planting Revision.JL.8.2021.xlsx

. . . . . .

Christine Blackwelder | Senior Environmental Scientist
O: 704.332.7754 M: 704.287.7646

-----Original Message-----
From: Joe Lovenshimer <jlovenshimer@wildlandseng.com>
Sent: Tuesday, February 8, 2022 4:05 PM
To: Kristi Suggs <ksuggs@wildlandseng.com>; Christine Blackwelder <cblackwelder@wildlandseng.com>
Subject: FW: [External] RE: Double H Planting Revision.JL.7.2021 (002).xlsx

Here is the most recent revision.

-----Original Message-----
From: Joe Lovenshimer
Sent: Wednesday, August 18, 2021 4:58 PM
To: Leslie, Andrea J <andrea.leslie@ncwildlife.org>; Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil>
Cc: Shawn Wilkerson <swilkerson@wildlandseng.com>; Christine Blackwelder <cblackwelder@wildlandseng.com>
Subject: RE: [External] RE: Double H Planting Revision.JL.7.2021 (002).xlsx

Hi Andrea and Kim,

Nice talking to you earlier. Here is the revised Double H planting list with the changes we talked about along with the old tables for easy comparison. Please let me know if you have any questions or additional thoughts.

-Joe

-----Original Message-----
From: Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil>
Sent: Tuesday, August 17, 2021 12:28 PM
To: Leslie, Andrea J <andrea.leslie@ncwildlife.org>; Joe Lovenshimer <jlovenshimer@wildlandseng.com>
Cc: Shawn Wilkerson <swilkerson@wildlandseng.com>
Subject: RE: [External] RE: Double H Planting Revision.JL.7.2021 (002).xlsx

Teams works for me

Kim Browning
Mitigation Project Manager, Regulatory Division I U.S. Army Corps of Engineers

-----Original Message-----
From: Leslie, Andrea J <andrea.leslie@ncwildlife.org>
Sent: Tuesday, August 17, 2021 12:25 PM
To: Joe Lovenshimer <jlovenshimer@wildlandseng.com>; Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil>
Cc: Shawn Wilkerson <swilkerson@wildlandseng.com>
Subject: [Non-DoD Source] RE: [External] RE: Double H Planting Revision.JL.7.2021 (002).xlsx

teams

_____

Andrea Leslie

Mountain Habitat Conservation Coordinator

NC Wildlife Resources Commission

645 Fish Hatchery Rd., Building B

Marion, NC 28752

828-400-4223 (cell)

www.ncwildlife.org <Blockedhttp://www.ncwildlife.org/>

<Blockedhttps://plus.google.com/u/0/b/104061933014720497710/104061933014720497710/about>
<Blockedhttp://www.facebook.com/pages/NC-Wildlife-Resources-Commission/169986143088699?sk=wall&filter=2>
<Blockedhttps://twitter.com/?lang=en&logged_out=1#!/NCWildlife>
<Blockedhttp://www.ncwildlife.org/News/Blogs/NCWRCBlog.aspx>
<Blockedhttp://www.youtube.com/user/NCWRC?blend=2&ob=video-mustangbase>

_____

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From: Joe Lovenshimer <jlovenshimer@wildlandseng.com>
Sent: Tuesday, August 17, 2021 11:44 AM
To: Leslie, Andrea J <andrea.leslie@ncwildlife.org>; Kim Browning <Kimberly.D.Browning@usace.army.mil>
Cc: Shawn Wilkerson <swilkerson@wildlandseng.com>
Subject: Re: [External] RE: Double H Planting Revision.JL.7.2021 (002).xlsx

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Hi,

Let's plan for tomorrow at 2:30. Would you prefer to do a Teams call or conference call?

-Joe

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_____

From: Leslie, Andrea J <andrea.leslie@ncwildlife.org <mailto:andrea.leslie@ncwildlife.org> >
Sent: Tuesday, August 17, 2021 11:20:32 AM
To: Kim Browning <Kimberly.D.Browning@usace.army.mil <mailto:Kimberly.D.Browning@usace.army.mil> >; Joe Lovenshimer <jlovenshimer@wildlandseng.com <mailto:jlovenshimer@wildlandseng.com> >
Cc: Shawn Wilkerson <swilkerson@wildlandseng.com <mailto:swilkerson@wildlandseng.com> >
Subject: RE: [External] RE: Double H Planting Revision.JL.7.2021 (002).xlsx

Of the times you are both available, I can make tomorrow 2:30-3:15 and today 3-4:00 work.

_____

Andrea Leslie
Mountain Habitat Conservation Coordinator NC Wildlife Resources Commission
645 Fish Hatchery Rd., Building B
Marion, NC 28752
828-400-4223 (cell)
www.ncwildlife.org <Blockedhttp://www.ncwildlife.org>

-----Original Message-----
From: Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil <mailto:Kimberly.D.Browning@usace.army.mil> >
Sent: Tuesday, August 17, 2021 8:44 AM
To: Joe Lovenshimer <jlovenshimer@wildlandseng.com <mailto:jlovenshimer@wildlandseng.com> >; Leslie, Andrea J <andrea.leslie@ncwildlife.org <mailto:andrea.leslie@ncwildlife.org> >
Cc: Shawn Wilkerson <swilkerson@wildlandseng.com <mailto:swilkerson@wildlandseng.com> >
Subject: [External] RE: Double H Planting Revision.JL.7.2021 (002).xlsx

Hi Joe
I am free today after 11, Wednesday all day (except 12:30 - 2:30), and Friday 9:00-12:30.
If you can work something out with Andrea that doesn't fit my schedule, go ahead and have the discussion with her and you can follow up via email with what you both worked out.

Thanks
Kim

Kim Browning
Mitigation Project Manager, Regulatory Division I U.S. Army Corps of Engineers

-----Original Message-----
From: Joe Lovenshimer <jlovenshimer@wildlandseng.com <mailto:jlovenshimer@wildlandseng.com> >
Sent: Tuesday, August 17, 2021 8:16 AM
To: Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil <mailto:Kimberly.D.Browning@usace.army.mil> >; Leslie, Andrea J <andrea.leslie@ncwildlife.org <mailto:andrea.leslie@ncwildlife.org> >
Cc: Shawn Wilkerson <swilkerson@wildlandseng.com <mailto:swilkerson@wildlandseng.com> >
Subject: [Non-DoD Source] RE: Double H Planting Revision.JL.7.2021 (002).xlsx

Hi Kim & Andrea,

I have a few questions related to this that may be easily resolved over the phone. Would you be available to briefly talk tomorrow afternoon? I am available between 2-4 pm. I can also make today work after 3 if Wednesday does not work for you. I neither work, I can likely make Thursday or Friday afternoons work.

Thank you,

Joe

-----Original Message-----
From: Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil <mailto:Kimberly.D.Browning@usace.army.mil> >
Sent: Wednesday, August 11, 2021 5:19 PM
To: Joe Lovenshimer <jlovenshimer@wildlandseng.com <mailto:jlovenshimer@wildlandseng.com> >
Cc: Shawn Wilkerson <swilkerson@wildlandseng.com <mailto:swilkerson@wildlandseng.com> >; Tsomides, Harry <harry.tsomides@ncdenr.gov <mailto:harry.tsomides@ncdenr.gov> >; Tugwell, Todd J CIV USARMY CESAW (USA) <Todd.J.Tugwell@usace.army.mil <mailto:Todd.J.Tugwell@usace.army.mil> >; Davis, Erin B <erin.davis@ncdenr.gov <mailto:erin.davis@ncdenr.gov> >; Haywood, Casey M CIV (USA) <Casey.M.Haywood@usace.army.mil <mailto:Casey.M.Haywood@usace.army.mil> >; Leslie, Andrea J <andrea.leslie@ncwildlife.org <mailto:andrea.leslie@ncwildlife.org> >; 'Wilson, Travis W. (travis.wilson@ncwildlife.org <mailto:travis.wilson@ncwildlife.org>)' <travis.wilson@ncwildlife.org <mailto:travis.wilson@ncwildlife.org> >
Subject: RE: Double H Planting Revision.JL.7.2021 (002).xlsx

Hi Joe,

We have a few questions regarding the revised planting list. The comparison from the approved planting list to the proposed list is helpful; however, the Final Mitigation Plan Sheet 3 (attached) did not contain river birch (Betula nigra) in the wetland or riparian lists. The revision you sent shows river birch in the wetland list for the old and the new. Andrea Leslie provided feedback on this and stated that it is only appropriate on larger systems, and requests that it be removed from the buffer and riparian lists, and from the substitute species list. If you have a good ecological reason to plant river birch on the site, please provide that justification.

We are concerned that American Elm is still listed. Andrea's comment in the draft mit plan regarding American Elm stated that it is not appropriate for Montane Alluvial Forests. The NHP guidance document explicitly calls that out as not being typical of the ecological community type.

WRC requests that you keep boxelder to 10% or less in the wetland mix.

We appreciate the new species listed - including the clarification on ironwood (Carpinus), cucumber magnolia, and the substitute list including yellow buckeye and silverbell.

Please reach out if you have any questions.
Thanks
Kim

Kim Browning
Mitigation Project Manager, Regulatory Division I U.S. Army Corps of Engineers

-----Original Message-----
From: Shawn Wilkerson <swilkerson@wildlandseng.com <mailto:swilkerson@wildlandseng.com> >
Sent: Wednesday, August 04, 2021 11:56 AM
To: Davis, Erin B <erin.davis@ncdenr.gov <mailto:erin.davis@ncdenr.gov> >; Tugwell, Todd J CIV USARMY CESAW (USA) <Todd.J.Tugwell@usace.army.mil <mailto:Todd.J.Tugwell@usace.army.mil> >
Cc: harry.tsomides@ncdenr.gov <mailto:harry.tsomides@ncdenr.gov> ; Joe Lovenshimer <jlovenshimer@wildlandseng.com <mailto:jlovenshimer@wildlandseng.com> >
Subject: [Non-DoD Source] Double H Planting Revision.JL.7.2021 (002).xlsx

Erin and Todd:

We are looking at revising our planting list slightly at Double H and wanted to run it by you. If there are others that you want to look at this (USFW or WRC) please forward and let me know if this is acceptable. If you have questions, please ask Joe (who is copied here).

Thanks,

Shawn

REVISED MITIGATION PLAN IRT CORRESPONDENCE

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF:

CESAW-RG/Browning December 21, 2020

MEMORANDUM FOR RECORD

SUBJECT: Double H Farms Mitigation Site - NCIRT Comments during 30-day REVISED Mitigation Plan Review and Sponsor Response to Comments

PURPOSE: The comments listed below were received during 15-day comment period in accordance with Section 332.8(o)(9) of the 2008 Mitigation Rule in response to the Notice of NCDMS Revised Mitigation Plan Review and Response to IRT Comments.

NCDMS Project Name: Double H Farms Mitigation Site, Alleghany County, NC

USACE AID#: SAW-2018-01771
NCDMS #: 100082
30-Day Comment Deadline: December 18, 2020

NCWRC Comments, Andrea Leslie:

1. We appreciate Wildlands' incorporation of input from NCWRC and the NC Natural Heritage Program on the planting plan and woody vegetation maintenance.
2. We are glad to see that Wildlands has identified on-site and nearby reference communities and NC natural community types for the wetlands/riparian areas. The natural communities document used is the 3rd approximation (*Classification of the Natural Communities of NC*, Schafale and Weakley, 1990). There is a more recent document – the 4th approximation (*Guide to the Natural Communities of NC*, Schafale, 2012) that is more appropriate to use when identifying natural community types. Please note this for the future.
3. We are glad to see the greater number of species in the riparian community and wetland plant lists. The riparian community type that was named is Montane Alluvial Forest (the 4th approximation analog for this community type in the setting is likely Montane Alluvial Forest, Small River Subtype). The woody riparian plant list includes species (Boxelder, American Elm) that the 3rd approximation reference notes are not in Montane Alluvial Forest communities. In addition, Black Gum in the mountains/piedmont is generally an upland species and is not appropriate in the planted area unless it's in an upland position. We recommend removing these species and including others that are noted in the Natural Communities references and/or found in the on-site/adjacent reference communities – e.g., Tulip Poplar, Sweet Birch, Ironwood.
4. The woody plant list for wetlands includes two upland species – Black Gum and Persimmon, which should be replaced with species more wetland-appropriate. Green Ash is noted in the 3rd approximation as inappropriate for Montane Alluvial Forest, as well.

5. At the 6/22/20 field visit, there was a channel flowing through Wetland V, and the group discussed the potential need to install sills or other grade control devices to minimize any chance of a headcut through the wetland. We didn't see anything in the plan regarding this – what did Wildlands determine appropriate at that location?

USACE Comments, Kim Browning:

1. **Original comment:**

Section 7.7 discusses wetland enhancement in association with stream restoration. A sufficient number of groundwater gauges need to be installed to adequately characterize the different soils, vegetative communities, and surface topographic variations found across the site for the enhancement wetlands.

WEI Response:
This section states that the wetlands slated for enhancement are adjacent to stream channels slated for restoration, but there is not a link between the stream restoration and the wetland enhancement. The wetlands will be enhanced through cattle exclusion and planting only. Wetland gages are therefore not included in the monitoring plan for this project. Wetland gages in Wetlands M and S will be provided to satisfy DWR's desire to understand the effect of the stream restoration on adjacent wetlands, but these are informational only and not tied to mitigation success criteria.

USACE Response:
In a situation where you are restoring a channel through existing wetlands it will clearly have an impact on the hydrology of the wetlands, potentially making it more or less wet. This could also affect the vegetation success and the jurisdictional status of the wetlands. As we have seen on other sites, this might mean that the area actually becomes too wet to support either the desirable species, or in this case appropriate bog habitat. We would still prefer to request gauges to track groundwater and a verification (by JD) that we don't lose wetlands as a result, especially in areas that are enhancement wetlands. If gauges are too cost prohibitive, at the least we are requiring that the limits of jurisdiction be re-verified prior to MY7.

2. **Original Comment:**

Section 8: A performance standard for wetlands needs to be added to this section. Specifically, it should discuss a wetland hydrology saturation standard, percent of vegetated cover in both the planted and bog areas, bog vegetation species diversity of at least four planted species, and that the wetlands must be jurisdictional at the end of the monitoring period. I would also suggest a percent cover versus open water for the bogs.

WEI Response:
Vegetative performance standards for planted woody stems are the same for both riparian and wetland areas. Performance standards for potential bog turtle habitat wetlands are now included in Section 8. No performance metric was included for hydrology since the wetlands are proposed for enhancement and preservation only. Additionally, since the wetland credit is coming from enhancement and preservation only, we did not include a criterion to re-delineate the wetlands at the end of the monitoring period.

USACE Response:
Please see response above regarding re-delineation of wetlands. Since you will be manipulating the hydrology by restoring the stream through the wetlands, we are requesting an associated hydrology performance standard for wetlands. You may choose to propose a non-standard performance standard,

such as one that there will be no net loss of wetlands due to stream restoration and it will be verified by JD prior to the end of monitoring year 7, as an example.

DWR Comments, Erin Davis:

The response to comments generally addressed my questions. DWR supports the request for a re-delineation later in monitoring.

Kim Browning
Mitigation Project Manager
Regulatory Division

PEBBLE COUNT DATA REQUIREMENTS CORRESPONDENCE

To: DMS Technical Workgroup, DMS operations staff

From: Periann Russell, Division of Mitigation Services (DMS)

RE: Pebble count data requirements

Date: October 19, 2021

The DMS Technical Work Group met September 29, 2021 to discuss Interagency Review Team (IRT) and DMS requirements for collecting pebble count data as part of monitoring (MY0-MYx). Agreement was reached between all attending parties that pebble count data will not be required during the monitoring period for all future projects.

Sediment data and particle distribution will still be required for the mitigation plan as part of the proposed design explanation and justification.

Pebble counts and/or particle distributions currently being conducted by providers for annual monitoring may be discontinued at the discretion of the DMS project manager. If particle distribution was listed as a performance standard in the project mitigation plan, the provider is required to communicate the intent to cease data collection with the DMS project manager. The absence of pebble count data in future monitoring reports where pebble count data was listed as part of monitoring in the mitigation plan must be documented in the monitoring report. The September 29, 2021 Technical Work Group meeting may be cited as the source of the new policy.

The IRT reserves the right to request pebble count data/particle distributions if deemed necessary during the monitoring period.

Ella Wickliff

From: Mimi Caddell
Sent: Wednesday, February 23, 2022 12:12 PM
To: Ella Wickliff
Subject: FW: [External] FW: Pebble Count Data Requirements

Mimi Caddell | *Environmental Scientist*
704.222.4918

From: Kristi Suggs <ksuggs@wildlandseng.com>
Sent: Thursday, October 28, 2021 11:19 AM
To: Tsomides, Harry <harry.tsomides@ncdenr.gov>
Cc: Mimi Caddell <mcaddell@wildlandseng.com>
Subject: RE: [External] FW: Pebble Count Data Requirements

Thanks Harry!

Kristi Suggs | *Senior Environmental Scientist*
O: 704.332.7754 x110 **M**: 704.579.4828

Wildlands Engineering, Inc.
1430 S. Mint St, Suite 104
Charlotte, NC 28203

From: Tsomides, Harry <harry.tsomides@ncdenr.gov>
Sent: Thursday, October 28, 2021 9:03 AM
To: Kristi Suggs <ksuggs@wildlandseng.com>
Cc: Mimi Caddell <mcaddell@wildlandseng.com>
Subject: RE: [External] FW: Pebble Count Data Requirements

Hi Kristi thanks for checking in. This data are now optional. A few things to keep in mind:

The pebble counts should still be collected in MY0/ baseline and reported (per their approved mitigation plan/addenda). For example Double H farms and Laurel Valley.

On “newer” projects without an approved mitigation plan, make sure to propose the approach accordingly and reference the memo in the mitigation plan for IRT review and approval.

Please make sure to document everything in the applicable monitoring reports (per the memo) to avoid any DMS or IRT confusion (Alexander farms, Deep Meadow, Vile, Crooked Creek, Little Pine etc)

If there are projects in monitoring that WEI believes would benefit from continued pebble count data collection then please continue, but that is up to your best professional judgment as the provider.

FD as well as DBB.

Thanks!

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Harry Tsomides
Project Manager
Division of Mitigation Services
NC Department of Environmental Quality

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5 Ravenscroft Drive
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From: Kristi Suggs [mailto:ksuggs@wildlandseng.com]
Sent: Wednesday, October 27, 2021 1:19 PM
To: Tsomides, Harry <harry.tsomides@ncdenr.gov>
Cc: Mimi Caddell <mcaddell@wildlandseng.com>
Subject: [External] FW: Pebble Count Data Requirements

Harry,

Jason Lorch in our Raleigh Office forwarded this meeting memo to me. It says that conducting pebble counts for DMS projects for monitoring (MY0 – MY7) projects is no longer needed as long as it has been okayed by the DMS PM. Moving forward, are you going to allow us to stop doing them on your projects? If so, will DBB projects be treated the same? Please let me know. Thank you!

Kristi

Kristi Suggs | *Senior Environmental Scientist*
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From: Jason Lorch <jlorch@wildlandseng.com>
Sent: Monday, October 25, 2021 9:05 AM
To: Kristi Suggs <ksuggs@wildlandseng.com>
Subject: FW: Pebble Count Data Requirements

Jason Lorch, GISP | *Senior Environmental Scientist*
O: 919.851.9986 x107 **M**: 919.413.1214

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From: Russell, Periann <periann.russell@ncdenr.gov>
Sent: Thursday, October 21, 2021 10:05 AM
To: King, Scott <Scott.King@mbakerintl.com>; Catherine Manner <catherine@waterlandsolutions.com>; Tugwell, Todd J CIV USARMY CESAW (US) <Todd.J.Tugwell@usace.army.mil>; adam.spiller@kci.com; Brad Breslow <bbreslow@res.us>; Davis, Erin B <erin.davis@ncdenr.gov>; gginn@wolfcreekeng.com; grant lewis <glewis@axiomenvironmental.org>; Jeff Keaton <jkeaton@wildlandseng.com>; katie mckeithan <Katie.McKeithan@mbakerintl.com>; Kayne Van Stell <kayne@waterlandsolutions.com>; Kevin Tweedy <ktweedy@eprusa.net>; Reid, Matthew <matthew.reid@ncdenr.gov>; Ryan Smith <rsmith@lmgroup.net>; Melia, Gregory <gregory.melia@ncdenr.gov>; Allen, Melonie <melonie.allen@ncdenr.gov>; Famularo, Joseph T <Joseph.Famularo@ncdenr.gov>; Rich@mogmit.com; Bryan Dick <Bryan.Dick@freese.com>; Ryan Medric <rmedric@res.us>; Kim Browning <Kimberly.D.Browning@usace.army.mil>; Kayne Van Stell <kayne@waterlandsolutions.com>; Worth Creech <worth@restorationsystems.com>; Jason Lorch <jlorch@wildlandseng.com>
Cc: Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov>; Wiesner, Paul <paul.wiesner@ncdenr.gov>; Tsomides, Harry <harry.tsomides@ncdenr.gov>; Reid, Matthew <matthew.reid@ncdenr.gov>; Dow, Jeremiah J <jeremiah.dow@ncdenr.gov>; Horton, Jeffrey <jeffrey.horton@ncdenr.gov>; Ullman, Kirsten J <Kirsten.Ullman@NCDENR.gov>; Ackerman, Anjie <anjie.ackerman@ncdenr.gov>; Blackwell, Jamie D <james.blackwell@ncdenr.gov>; Xu, Lin <lin.xu@ncdenr.gov>; Mir, Danielle <Danielle.Mir@ncdenr.gov>; Corson, Kristie <kristie.corson@ncdenr.gov>; Russell, Periann <periann.russell@ncdenr.gov>; Sparks, Kimberly L <Kim.sparks@ncdenr.gov>
Subject: Pebble Count Data Requirements

Please review the attached memo documenting the agreed upon policy for pebble count data requirements.
Please reply (me only) to this email if accept that this memo represents (or misrepresents) our discussion on Sept 29.
Thank you.

Periann Russell
Geomorphologist
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NC Department of Environmental Quality

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